FURNITURE MAKING

AND

CABINET WORK

A Handbook

BY

B. W. PELTON

MACMILLAN AND COMPANY LIMITED
Bombay Calcutta Madras

PREFACE

This book furnishes the information to enable any man having ordinary manual dexterity and possessing a few essential woodworking tools to make a wide variety of useful articles of furniture. Clear and complete instructions are provided for constructing new outdoor furniture, indoor furniture, built-in pieces, and, in addition, methods are presented for the repair, rebuilding and restoration of old pieces of furniture. Home remodeling operations are presented also.

In order to bring such a wide range of activities within the means and ability of the home mechanic, the plan of this book breaks down each job according to a uniform sequence. First there is given a full-dimensioned drawing of the actual construction. This is followed by a complete bill of material. Then every step in the actual construction, from preliminary roughing to final finishing, is explained in detail.

All the necessary related information has been included in this book. There are clear explanations of every operation in woodworking and wood joinery, of the various methods of upholstering and seat weaving, of the application of veneers and inlays and of furniture finishing with the coating materials now in use. The chapter on interior decoration presents the basic principles necessary to plan the furnishings of the home in accordance with a harmonious over-all plan. In short, this book has all the information needed to enable any practical man to undertake a great number of jobs and constructions in furniture making and cabinet work with full confidence in the quality of the results and the appearance of his home.

B. W. PELTON

January 1949

CONTENTS

I

CABINETMAKING

BECAUSE our country's pioneers became of necessity competent handicraftsmen imposes no obligation upon the present generation of steam-heat and pushbutton settlers to emulate them with sweat and calluses. Financial considerations permitting, we are able to acquire almost any type of furniture our hearts desire, from well-constructed replicas of authentic antiques to comfortable creations of modern design. If unable to satisfy completely all his furniture wants at one time, the average householder budgets his purchases and buys carefully, thereby acquiring an increased pride of ownership derived from a well-considered comparison of values.

It is doubtful, however, whether this ultimate pride of possession ever approximates the deep satisfaction of the craftsman who successfully constructs a comfortable and useful piece of furniture that in appearance and workmanship closely resembles the product of experienced cabinetmakers. To achieve such a result through one's own planning and with one's own hands is a tangible monument to the self-reliance and the inherent ability of an amateur to invade successfully the guild of master craftsmen. This guild is not only an ancient but also a most honorable one, whose members were, and still are, truly artists in wood, although the pride of craftsmanship that formerly prompted so many of them to sign their products has necessarily disappeared as the result of our modern system of specialization and mass production, under which no one individual can be entirely responsible for the finished product.

It is not the intention here to decry the results of mass production, nor to attempt an evaluation of the impact on our national economy of the millions of man-hours that increased recreational time may channelize into home products from various hobby crafts. The goal is much more tangible—the erection of simple guideposts welcoming the reader to the Ancient Order of Handicrafters. In that spirit this book is aimed at those individuals in whom there exists some vestige of the soul-satisfying urge to *create* something useful during their spare time. By-products such as patience, concentration, observation, and foresight are not to be sneered at, but there is no desire to proselyte in the interests of character

building or mental discipline. That would be trading a joyous hobby for the flagellant's whip.

The earlier craftsmen would have scorned such hardware aids as metal angle irons, corner plates, folding lid stays, or manufactured drawer pulls, relying instead upon the strength and decorativeness of accurate jointing alone. In this and other chapters, however, where such devices are considered logically economic and relatively invisible, they are included in various projects, such as kitchen tables or outdoor furniture. It is felt that these modern aids to construction represent a desirable saving in time and effort, where the intricacy and precision of craftsman-like joinery would exert relatively little influence on the final decorativeness of the product.

It is well to realize that cabinetmaking or furniture construction can be planned to include designs and methods that are so elementary that even the beginner can produce a utilitarian object of satisfying appearance. Examples of such items are included in various succeeding chapters as "kindergarten" projects—bait, if you will, for the timorous, in the belief that there is nothing like the completion of a successful venture to encourage more ambitious design and craftsmanship.

With an increased understanding of the properties of various woods and materials comes a wider feeling for their possibilities; later the constructive imagination of the home mechanic will be limited only by his own confidence. From simple beginnings more ambitious enterprises will inevitably be undertaken, each requiring close attention to details. Cabinetwork demands careful concentration from its devotees, but no more so than any other successful handiwork, from sewing to barn raising. In constructing a piece of furniture, the amateur craftsman had opportunities for exercising not only a nice precision and patience, but also foresight and systematic planning.

If planning is a prerequisite to successful performance in general, then its need will be particularly apparent in cabinet or furniture construction. No matter how crude the result, it will pay the amateur craftsman to sketch his plans before proceeding to dissect his material with saw, auger, or chisel. This is especially true in furniture design, because of the hidden jointing that must be employed at certain points. If the beginner will upend and closely study an available piece of furniture of good workmanship, he is sure to discover methods of construction that will be of value during the preliminary planning phase.

The series of undertakings progressively suggested, is intended as an example of what can be constructed with hand tools, and is proposed as a guide for independent planning and development. Various methods of jointing and cabinetwork are illustrated, often in the construction of similar details, proving that, although "common practice" may prevail in different localities for varying periods, in the final analysis each craftsman will inevitably work out individual details to suit his own feeling and technique. The ultimate criteria of the value of a piece of furniture must include affirmative answers to the questions: (1) Will it serve its intended purpose or purposes? (2) Does it provide eye appeal?

Design. Obviously design in furniture cannot be considered as a mere abstraction. Artists often create designs that are of great beauty and high artistic merit; if they are not adaptable to utility, however, the basic purpose of the object is lost, or subordinated. Hence the artist-craftsman is his own best designer, for he will scrutinize and criticize his product from the essential viewpoint of service. Not only will he choose a bold or a delicate design according to the characteristics of the material employed, but also he will insure that a chair is comfortable or a table is sturdy and of the proper height. The same will be true of his selection of contours or embellishments, for as a craftsman he is always aware of the basic requirement of purpose.

Proportion. Good design in furniture is the product of several factors, not the least of which is the observance of proper proportion. Good proportion results from a harmonious relationship between the various parts, a balancing of masses. Here again the utility or the purpose for which the object is intended will determine the direction of the primary mass; in a bookcase the largest dimension will be in a vertical plane, whereas in a desk the primary mass will be horizontal. This dominant mass may be subdivided vertically, horizontally, or in both directions; into two, three, or more masses, which must be proportionally located. The following suggested ratios will, in general, satisfy the eyes of the beholder, thus insuring a sense of good proportion:

1. Of two horizonal divisions one section should be larger than the other. Equal horizontal divisions tend to become monotonous.

2. For the same reason, the central of three horizontal sections should predominate.

3. Four or more horizontal sections should gradually diminish in size, with the largest one at the bottom.

4. Two vertical sections should be equal. The eyes would be dissatisfied with an unequal lateral ratio.

5. Of three vertical divisions, predominance should be given the center section.

6. With four vertical divisions, three choices are possible: all four sections can be constructed of equal size: the two central sections can be of equal size but larger than the two outer, equal sections; or the reverse.

The esthetic appreciation of proper proportion is customarily attributed to the possession of a mythical quality known as "good taste." By many, this discriminating feeling is believed to be inherent, conferred by some good fairy at birth. The truth of the matter is that regardless of a person's innate artistic bent or lack of it, the decision as to good taste will be automatically taken care of by the eyes, after they have been afforded proper yardsticks for comparison. Our ever-restless eyes automatically travel toward and focus upon successive centers of interest, such as the dominating masses or divisions described above. Our eyes, in their automatic search for variety and interest, become dissatisfied with the monotony of equal divisions and masses. For one who has been otherwise preoccupied, it may be necessary to arrange a brief training period for the eyes, by affording them

sufficient opportunities to observe and study examples of well-proportioned furniture of recognized workmanship.

Outline. In considering the shape or outline of furniture, utility again exerts a deciding influence. The formation of the basic structure is determined by the purpose the piece is to serve; this basic shape can be modified to a graceful outline only to an extent that will not impair the fundamental requirement of utility. The same is true of the shaping of divisions and of decoration. A graceful outline is insured by unity of design, the achievement of a restrained dignity through the blending of simplicity, proportion, and successful eye guidance.

The eye will travel at an accelerated pace along smooth lines and curves, but becomes confused by harsh collisions. Although rectangles may be required in the basic structural design, corners can be rounded, and sharp angles opened, to speed up the eye's indecision at abrupt changes in direction. Nature offers countless examples of gracefulness in the outlines of curving branches and flower stems. For this reason elliptical curves so proportioned that they lead the eyes effortlessly to a central, dominating feature will give to the entire composition a harmonious theme.

For the amateur without access to power tools, the production of curves is a somewhat disheartening prospect. Until the confidence of successful achievement is his, he will do well to translate his curves and ellipses into series of lines or steps for the eyes to follow. If these steps are proportional, the eyes will follow a pleasing series of points in ascending and descending proportion. So, too, hexagonal or octagonal outlines can be substituted for the continuity of a circle, and the chamfering of sharp corners can be relied upon to replace a round leg or column.

To sum up: to insure a harmonious whole avoid monotony, provide the eyes with smooth lines for movement, and create a center of interest.

Material. Just as the kind of material may control the choice of the over-all type of design, so the texture, grain, and figure of the wood will exert a strong influence on the way it is to be worked or the place it is to occupy in the ensemble. This principle may be observed in the doors of well-designed furniture, which have stiles and rails of straight-grained stock, but frequently use panels of wavy-grained woods. Although oak has been one of the most popular choices for the fabrication of sturdy English and Early American furniture, it will be noted in a later table that its basic hardness, plus its coarser texture, limits its use to the more rudimentary designs that include only elementary embellishments, such as chamfering and gouge cutting. Because of this essential hardness and obvious durability, designs for oak furniture very properly feature a sort of masculine ruggedness, resulting in pleasing simplicity. On the other hand, the finer grain of mahogany and the silky texture of walnut are readily adaptable to various forms of design, from the earliest antique to the latest modern.

FURNITURE WOODS

Many data are now available for the study of our native woods, thanks to the United States Department of Agriculture and its Forest Products Laboratory. For everyday information and advice, however, the home craftsman will find it profitable in more ways than one to cultivate an acquaintance with the local lumber dealer and, if possible, to use the local lumber yard as his laboratory. Thus he not only will learn what stocks of material are on hand or readily available, but also he may gain access to dark corners where odd pieces, or "shorts," have been forgotten, to be disposed of at reduced prices.

Furniture that is to be stained and polished or finished in natural tones will in all probability be constructed from one of the hardwoods; painted or lacquered furniture can be assembled from softwood. The term "hardwood" is not used to describe the physical hardness of the wood; it refers to the botanical group of broadleaved or deciduous trees, while softwood comprises the nondeciduous conifers, with their needlelike leaves. Many hardwoods are softer than the average softwood, and vice versa. In general, it may be considered that the harder the wood, the heavier and stronger it will be.

Another general classification used that is of importance to furniture- and cabinetmakers is that of the grain in wood, which will determine the most suitable method or type of finish to be applied. Technically, the grain of the wood is determined by the direction, size, arrangement, or quality of the fibers (cells) of wood structure. Close-grained wood has narrow and somewhat inconspicuous rings, the reverse being true in coarse-grained woods. Painters and finishers, however, are more concerned with the texture caused by the tubelike vessels whose openings on the surface of a cut piece of wood are referred to as "pores." Woods with large pores, such as oak, ash, chestnut, and walnut, are known as "open-grained" woods. They must have their pores closed with a filler before paints or finishes can be satisfactorily applied. Nonporous woods (with small pores) are termed "close-grained."

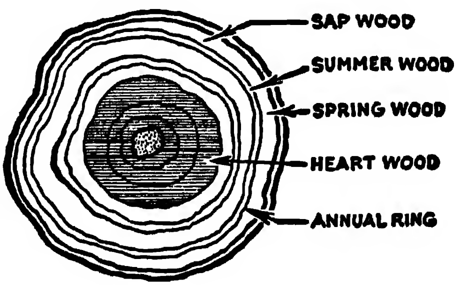


FIG. 1.1. Cross section of tree showing growth rings.

In many species of wood each annual ring of growth (Figure 1.1) is divided with more or less distinctness into an outer layer of summer wood and an inner layer of spring wood cells. Because trees grow more rapidly in the springtime, the spring wood is usually lighter, softer, and weaker than the summer wood, which is composed of cells that have been added more slowly. In certain species of trees such as the maples and gums, however, there is no appreciable difference between the spring and summer woods.

Under the soft, moist inner bark of a log is the microscopic Cambian layer, which forms wood and bark cells. Next comes the light-colored series of active spring and summer woods called the "sapwood," because it carries the sap from the roots to the leaves. The heartwood, extending inward to the soft pith at the structural center of the log, consists of inactive tissue formed by a gradual change in the sapwood. Medullary rays connect the various layers for the storage and transference of food.

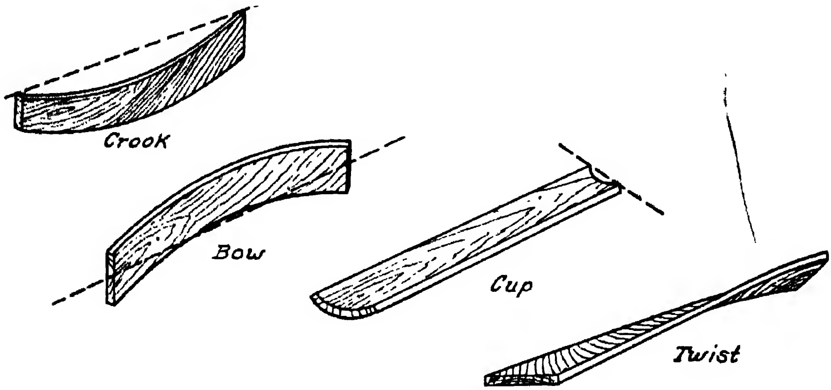


FIG. 1.2. Lumber shrinkage.

Although inactive, it is the heartwood that serves to give strength to the tree trunk. The living sapwood, however, is a mature wood which, when dry, exhibits no consistent difference in weight or strength from the heartwood, except in a few species. Heartwood is usually darker in color except in basswood, cottonwood, and much of the yard lumber intended for building construction.

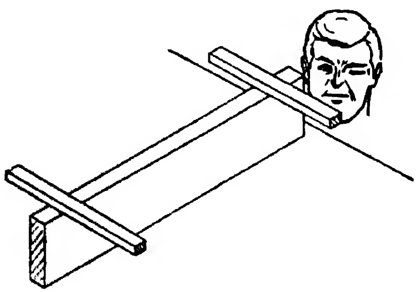
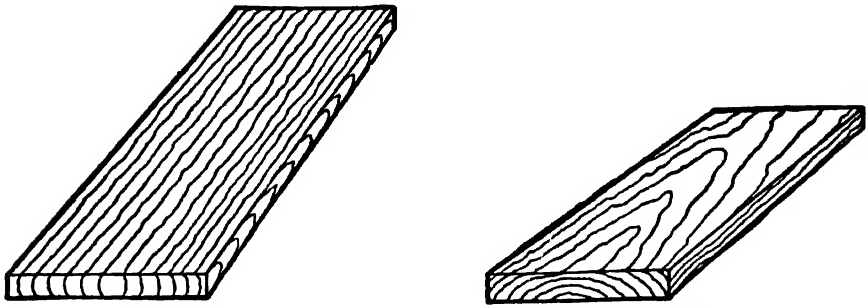


FIG. 1.3. Winding strips.

All lumber shrinks as it dries during seasoning. This shrinkage causes the distortion commonly referred to as "warp," four general types of which are shown in Figure 1.2. To determine the approximate amount and direction of twist or wind along the edge of a piece of lumber, so-called "winding strips" can be employed, as shown in Figure 1.3. These small straightedges are placed parallel to each other so that by sighting along their top edges the slightest twist in the surface will be revealed.

This lack of stability is more noticeable in flat-sawed lumber, where the shrink-

age is on the sapwood or bark side, opposite the heartwood side. That is why it is customary to keep the heart side on the upper or outside surface of the work, so that in the event of cupping, a concave rather than a convex face will be shown. Quarter-sawed lumber (Figure 1.4 A) shrinks and swells less than the flat-sawed



Quarter-sawed
A

Plain-sawed
B

FIG. 1.4. Appearance of grain.

lumber shown in Figure 1.4 B. In addition it wears more evenly, is less permeable to liquids, and does not surface-check or split as badly as the flat-sawed wood. Quarter-sawed lumber is also known as "edge-grain" or "comb-grain"; flat-sawed lumber is called "plain-sawed," "slash-cut," or "bastard-sawn."

Wood for furniture must be thoroughly seasoned before use, for wood contains hundreds of tiny cells that shrink as the moisture leaves their walls, thus causing a change in the over-all size of the piece. Therefore, improperly seasoned lumber used in furniture construction will cause warping, shrinking, or checking in the various parts of the finished article. Old-time cabinetmakers would not lay their hands to a piece of wood that had not been seasoned in some dry loft for a year or more.

Air seasoning reduces the moisture content of lumber between 12 and 15 per cent, which is not sufficiently low for furniture construction. Modern, controlled kiln drying will dry the stock to the approximate moisture content that furniture will obtain in service—5 to 8 per cent. Since any piece of wood will give off or take on sufficient moisture from the surrounding air so that the moisture in the wood and the moisture in the air are in balance, it is obvious that kiln-dried lumber must be stored in a dry, warm place while it is awaiting construction.

When permitted freedom of choice, the cabinetmaker will select a wood possessing good working qualities, which he knows will finish nicely. Therefore, the following table of characteristics or working properties should be used in conjunction with the table for finishing to be found in Chapter 5. Certain softwoods have been included in both tables for paint or lacquer finishing.

PROPERTIES OF

Species	*Wt.**	*Hardness*	*Strength*	*Works Easily*	*Stability*	*Splits Easily*	*Glues Well*
Alder, red	28	Medium	Low	Yes	Good	Moderately	Yes
Ash, black	34	Medium	Medium	No	Good	Moderately	Moderately
white, commercial	41	Hard	Good	No	Good	Moderately	Moderately
Basswood	26	Soft	Low	Very	Good	No	Yes
Beech	45	Hard	Good	No	Poor	No	No
Birch, yellow, sweet	44	Hard	High	Yes	Fair	No	No
Butternut	27	Soft	Low	Yes	Good	Moderately	Yes
Cedar, Eastern, red	33	Soft	Low	Yes	Good	Very	Yes
Cherry, black	35	Medium	Good	Yes	Excellent	Yes	Moderately
Chestnut	30	Soft	Low	Yes	Excellent	Yes	Yes
Cypress	32	Soft	Medium	Moderately	Good	Yes	Yes
Douglas fir	34	Medium	Good	Yes	Poor	Yes	Yes
Elm, rock	44	Hard	Good	Moderately	Good	No	Moderately
(slippery), soft	37	Medium	Medium	Moderately	Good	No	Moderately
Gum, red, sap	35	Soft	Medium	No	Fair	No	No
black, tupelo	35	Soft	Medium	No	Fair	No	No
Hackberry	37	Medium	Low	Moderately	Good	No	Yes
Hickory, true	51	Very	High	No	Poor	Moderately	No
pecan	45	Hard	High	Moderately	Poor	Moderately	Yes
Magnolia	35	Soft	Low	Yes	Fair	No	Moderately
Maple, hard	44	Very	High	Moderately	Good	Yes	Moderately
soft	33	Hard	Good	Yes	Fair	No	Moderately
Oak, white	47	Very	High	No	Good	Moderately	Moderately
red	44	Very	High	No	Good	Moderately	Moderately
Pine, white, ponderosa	27	Soft	Low	Very	Excellent	Yes	Yes
Poplar, yellow	28	Soft	Low	Very	Poor	Moderately	Yes
Redwood	28	Soft	Medium	Yes	Good	No	Yes
Sycamore	34	Hard	Medium	Yes	Poor	No	Moderately
Walnut, black	38	Hard	High	Yes	Excellent	Moderately	Moderately
Mahogany, (imported) various kinds	Hvy	Hard	High	Yes	Excellent	Yes	Yes

* Per cubic foot, air dry (12 per cent moisture content).

Native Woods

Decay Resistant	*Grain*	*Color of Heartwood*	*Remarks*
Moderately	Uniform pores	Pale pinkish-brown	A Pacific coast favorite
Moderately	Straight; porous	Grayish-brown	Takes a good finish
Moderately	Straight; porous	Ditto with reddish tinge	Wears well
No	Straight	Creamy white to creamy brown	"Linden"; used as core stock
No	Lacking; close	Reddish white to reddish brown	Resists abrasion
No	Straight, close and fine	Reddish-brown	A sturdy cabinet wood
Moderately	Straight	Light chestnut brown	"White walnut"
High	Uniform texture; knotty	Light reddish-brown	An aromatic liner
Moderately	Straight, close and fine	Light to dark reddish-brown	Scarce; fine for turnings
High	Straight and porous	Grayish-brown	Finishes warm, mellow, Jacobean
High	Straight	Reddish to black	Durable outdoors
Moderately	Wavy	Orange-red to red	Common plywood veneer
Moderately	Wavy	Grayish-brown with red tinge	Bends well
No	Wavy	Ditto to dark brown	Ditto; softer
No	Uniform texture	Reddish-brown	Pinch hits for mahogany,
No	Interlocking cross-grain	Moderately dark brownish-gray	maple and walnut
Moderately	Straight	Light yellow-gray	Limber; includes sugarberry
No	Straight	Reddish-brown	Excellent for steam bending
No	Straight	Reddish-brown	Ditto; softer
Moderately	Porous	Light to dark purple	Included in lower grades of poplar
Moderately	Straight, curly or wavy	Light reddish-brown	Colonial choice for furniture
Moderately	Straight and close	Light reddish-brown	wood
Moderately	Coarse and porous	Grayish-brown	Less permeable to liquids
No	Coarse and porous	Ditto with flesh tints	Both are sturdy, masculine woods
Moderately	Straight and close	White	Basis for painted furniture
No	Straight	Yellowish-brown with green tinge	A workshop favorite
High	Straight and even	Cherry to dark mahogany	Excellent for outdoors
Moderately	Interlocked	Flesh brown	Quarter-saws attractively
Moderately	Straight and porous	Chocolate brown	The aristocrat of native woods
Moderately	Interlocking figure; close	Red-brown to dark brown	The nonpareil

Lumber comes dressed or surfaced on one side (S1S), two (S2S), or more sides in the following standard dimensions:

STANDARD DIMENSIONS FOR LUMBER

	Thickness				*Width*							
Softwood, surfaced (S1S) or (S2S)	25/32	1 1/16	1 5/16	1 5/8	2 5/8	3 5/8	4 5/8	5 5/8	7 1/2	8 1/2	9 1/2	10 1/2
Hardwood, rough (Thickness)	3/8	1/2	5/8	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
Hardwood, surfaced (S2S) (Thickness)	3/16	5/16	7/16	9/16	1 1/16	1 3/16	1 5/16	1 3/4	2 1/4	2 3/4	3 1/4	3 3/4

Standard lengths of softwood range from 6 ft. to 18 ft., usually by intervals of 2 ft. Standard lengths of hardwood range from 4 ft. to 16 ft., by intervals of 1 ft. Hardwood lumber is cut in random widths of 3 in. and up.

WOODWORKING OPERATIONS

No matter what kind of wood has been selected, the amateur woodworker must apply a knowledge of and a degree of proficiency in certain basic carpentry operations in order to convert the raw material into his dream project. None of these operations is too difficult for the average person to master, and each is usually a prerequisite to another in achieving the desired result.

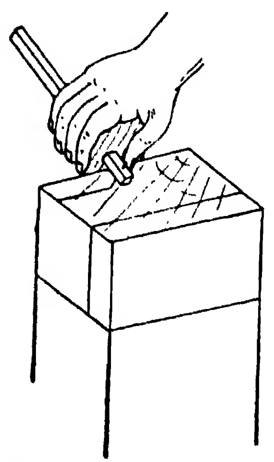


FIG. 1.5. Use of marking gage.

Marking. Accurate marking is a basic requirement for good cabinet work. A pencil held along the edge of a try square will satisfy the necessities of ordinary carpentry, but for laying out joints in furniture making, a marking gauge with a sharp spur or scribing point will afford more accurate results. After the proper width is set off on the measuring shaft, the block is clamped tight and held squarely against the guiding edge, with the scriber slanted as shown in Figure 1.5. To prevent the point from digging in and following the grain, only a light pressure should be employed, the scribing operation being repeated if the first line is too delicate. For fine, small work such as tenons, dovetails, and so on, all four sides can be

marked or squared to good advantage. To accomplish this accurately, the top and bottom are marked with the aid of a try square, before the sides are joined. A sharp point will insure accurate marking; for delicate work some mechanics substitute a phonograph needle.

Sawing. In sawing along marked lines it is necessary to remember that the saw cut, or kerf, has a width of its own, approximately $1/16$ of an inch. Therefore, sawing the kerf on the wrong side of the scribed line will result in a change of the dimensions in the completed work. Sometimes the kerf will be on the outside of the line, as in the case of a tenon; with a mortise, the saw cut must be placed on the inside of the scoring. If too much wood remains after sawing, it can be planed or pared off; too little is hard to replace. The rule is, then, *always saw on the waste side of a line.*

As for the operation of sawing itself, some mechanics prefer to start the kerf with a knife cut to insure a smooth entrance. Although sawing at a 45° angle is considered easiest, shallow, horizontal sawing must be resorted to when tenons, mortises, dovetails, and other joints are to be cut at right angles to another kerf. The line of vision should be directly above the saw cut at all times, with only the top edge of the saw blade visible.

Sawing miters is simplified by the use of commercial metal miter boxes, which can be set at any desired angle. Everyone is familiar with the box-type miter boxes assembled by home mechanics from scrap hardwood lumber. In making such a box care should be exercised not only that the front and back are square with the base, but also that their tops are level, so that when the steel framing square is laid on their edges it too will be level. For 45° kerfs equivalent inch marks on both legs of the square are lined up on the same side of each edge, as in Figure 1.6. For accommodating wider pieces, some mechanics prefer the bench

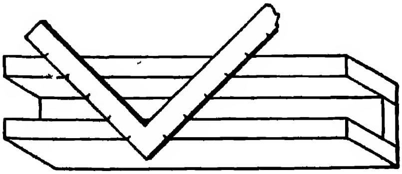


Fig. 1.6. Laying off 45° angle in miter box.

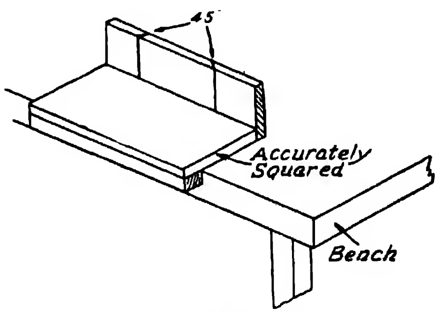


Fig. 1-7. Bench hook.

hook pictured in Figure 1.7. Because all saw cuts are made on the forward stroke, the bench hook is automatically held in place without clamps by the pressure against the lower strip or hook. However, since there is no rear member to guide the saw, complete reliance upon accurate marking is necessary.

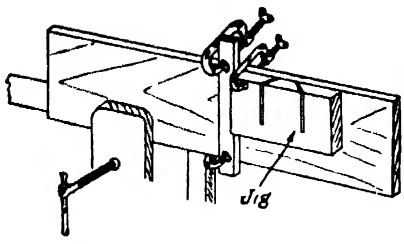


FIG. 1.8. Miter jig for deep cuts.

For sawing miters in very wide material the method shown in Figure 1.8 will prove successful. A jig is made made by cutting two 45° kerfs in a piece of 2-in. stock (or 1-in. hardwood), 10 or more inches in width. The material to be mitered is held firmly in the bench clamp, and a straightedge piece is adjusted loosely in clamps until it is in the proper position as a stop for the jig at the desired cut. The straightedge is then trued up with a square and clamped in place with the jig clamped firmly against it. When the saw nears the bottom of the cut the jig is lowered against the straightedge and reclamped.

If a miter box is lacking, or if a board is too wide for the box, an accurate miter can be laid out with the try square. A line is first drawn along the edge of the square across the width of the board. From the intersection of this line with the board's edge the width of the board is laid off along the edge, and a line drawn across the board parallel to the first line. A diagonal between the proper corners of this perfect square will accurately place the miter.

Saw Kerf Bends. To insure uniform bends in wood without steaming, a series of saw kerfs on the inside of the bend must be equally spaced so that they will all be closed at the top when the desired curve is achieved. In ¾-in. stock an initial kerf ⅝ in. deep is cut and from it a distance is marked off equal to the radius of the required bend. With the far end of the lumber clamped to the bench top as shown in Figure 1.9, the opposite end is bent upward until the saw kerf closes. The

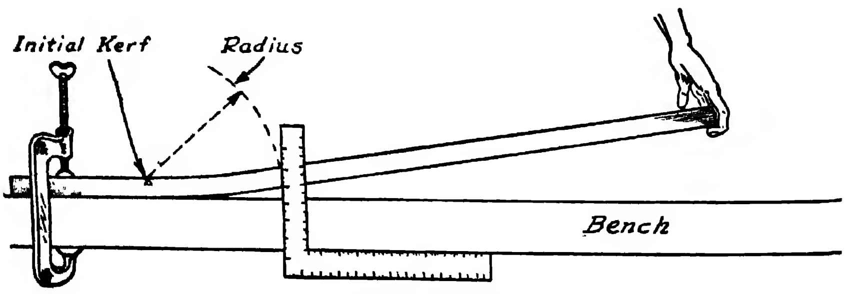


FIG. 1.9. Calculating saw kerf bend.

height measured between the lower edge of the board and the top of the bench at the radius mark will be the amount each kerf is to be spaced. All kerfs should be sawed to an equal depth.

Planing. Many pieces of wood, after they are sawed to proper lengths, or

ripped to the required width, need only be planed smooth to be ready for fastening in their proper places. Although it is a basically simple operation, planing, too, has a technique of its own. While it is true that the angle of the chisel or cutter is a deciding factor in the plane's manner of performance, various planes are constructed for various operations. Wherever possible, all planing is done in the direction of the grain; it may be necessary to change direction, however, in the case of irregularly grained woods.

The jack plane is used for the first rough surfacing, followed by the shorter smoothing plane, whose cutter has been set to a minimum working edge. If sufficient stock is to be planed off to warrant marking with the gage along both sides, the progress of the work can be accurately noted.

In spite of this precaution there is always the probability that the planed edge will not form a true right angle with the lower surface. For narrow edges, the use of the winding strips, described for the detection of warpage in a preceding section of this chapter, will prove of value. During or after planing, a straightedge laid along the newly planed surface will reveal any existing valleys when viewed against the light.

The difficulty of planing end grain with the block plane is greater in the hardwoods than in the softwoods, for, there is always the strong likelihood of splitting off the end fibers. This splitting can be prevented by clamping a piece of waste tightly against and flush with the far end, and planing across its surface with each stroke. Wide end grains can be planed inward from both sides.

The exactness required in cabinet work has resulted in the manufacture of a jig known as a "shooting board," Figure 1.10. Such a device can be made by the

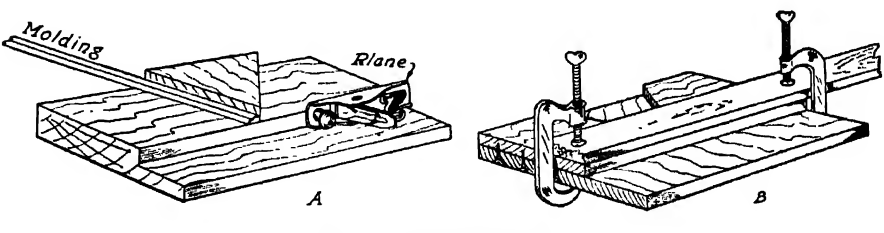
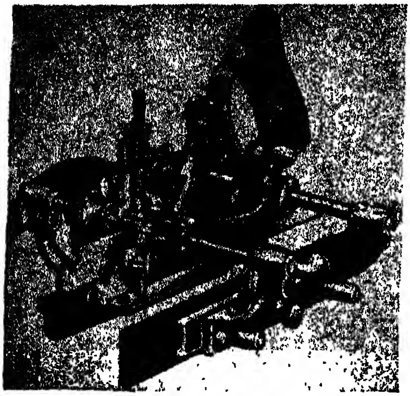


FIG. 1.10. Shooting boards.

home mechanic out of scraps of hardwood, and will more than repay its owner for the time-saving precision it makes possible. If thin hardwood material is available, the well for the removable triangle can be built up, instead of laboriously gouged out. Care must be taken that the stepped front edge is true, and that the triangular block is an accurate right angle, so that mitered edges can be planed with exactitude.

The operations performed by a variety of separate planes constructed for rabbeting, tonguing, grooving, plowing, dadoing, beading, and molding are now combined in one plane, appropriately known as a "combination plane." If within



Courtesy of Stanley Tools

FIG. 1.11. Combination plane.

the home craftsman's means, this tool is well worth buying; it is accompanied by complete instructions for its adjustments. As shown in Figure 1.11, it is equipped with a removable fence and a variety of cutters or chisels, making it in effect a hand-operated power tool of amazing versatility. Experience and practice will widen the scope of its possibilities.

"Chamfering" is the term used for the operation of leveling off the corners of two faces at right angles to each other. It can be accurately accomplished with a chamfering plane like the one shown in Figure 1.12, which has an adjustable blade that can be lowered as the work progresses. If such a plane is not available, it is customary to draw guide lines on both faces, rough-chisel the edge, and finish with a smoothing or jointing plane. "Stop chamfering" is the term used when the chamfer swoops up gradually at each end. Saw cuts at each end are usually made to limit the plain chamfer, which is later graded upward with a spokeshave.

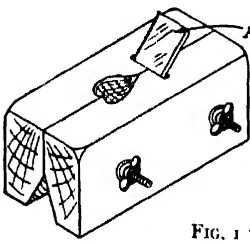


FIG. 1.12. Chamfering plane.

Sanding. After a piece of wood is smoothed to the limit of a plane's capabilities, it is customary to refine the work by the application of a coated abrasive, or grit paper. Abrasive papers come in standard 9 in. x 11 in. sheets, coated for the most part with particles of garnet, quartz, or flint. The variation in the size of grits ranges from 8/0 to 4, as follows:

Classification	*Size of Grits*	*Type of Cabinetwork*
Fine	Dry: 8/0–2/0	Smoothing down prior to finishing
	Wet: 8/0–6/00	Primary varnish sanding
Medium	1/0–2	Preliminary smoothing (after planing)
Coarse	2½–4	Paint and varnish removal End-grain glazing

There is a choice of abrasives for every purpose and each type of wood. In constructing furniture the finer grades of grit papers will normally be selected for gently smoothing the finer grains of hardwood that will probably be used.

As in planing, the abrading or cutting is performed *with* the grain, and under an equal pressure. It is necessary to back up abrasive papers with some form of rigid block in order to equalize the pressure in cutting, thus preventing grooving. Every effort must also be exerted to prevent a twisting of the paper, which tends to produce cross-grain scratches.

Blocks similar to those commercially available can be contrived by the home mechanic to suit the work in production. For preliminary rough work, much elbow grease and weight are required; therefore, the block can be a heavy brick, covered by some durable material such as canvas, laced or sewed on the upper surface. Customarily, commercial sanding blocks have various ingenious methods for clamping the abrasive paper in place. Inasmuch as these sanding mediums quickly lose their cutting power when the abrasive particles become dull, it is necessary continually to expose new surfaces. A block of wood 1 in. x 3 in. x 5 in. with a felt backing or a section of old inner tube glued to the underside will satisfy most requirements.

Not the least cause of dullness of the sanding block is that the wood dust removed packs itself into the interstices between the abrasive particles to such an extent that they are unable to bite, even if still sharp. A scrubbing brush with even bristles, nailed on its back at the end of the workbench, will prove a valuable aid for the frequent elimination of this dust pack. Some mechanics prefer to massage the packed sandpaper with a more flexible cleaner, such as a bottle brush or a nail brush. Regardless of the method employed, it must also be remembered that a portion of the wood dust plugs up the pores in the wood also. This, too, must be removed before finishing operations are begun or the results will be entirely unsatisfactory. A quick way to effect this removal at frequent intervals is by means of a small brush attachment connected to the vacuum cleaner.

For irregular surfaces, appropriate sanding blocks must be employed, such as dowels, sponge rubber cakes, portions of solid rubber balls, or strips of the abrasive itself, pulled like a shoe-shine rag around the part to be sanded. The finer abrasives used after the preliminary heavy sanding require a proportionally softer block; blackboard erasers, slabs of cork, or blocks to which several layers of old inner tube have been cemented are excellent for the purpose. These softer types of blocking are especially necessary because the finer grits are imbedded in a more flexible, softer type of backing.

Another abrasive medium available, which is especially useful on irregular surfaces, is steel wool. Its cutting powers are comparable to grits of 000, 0, 1, and 2. The 000 steel wool gives a sheen to hardwood surfaces unequaled by the finest grit papers. Before finishing, some mechanics pass a magnet over the abraded surface to pick up all particles of the metallic wool.

The delicate art of sanding between varnish coats can be successfully accom-

plished by the amateur through the use of wet sanding papers. These fine-grit abrasives are extremely tough and impervious to the water in which they must be soaked before application. Prior to the use of these abrasives, the varnished surface is sprinkled with a fine spray of water from any available laundry sprinkler. After the surface is sanded, it must be carefully sponged off, then wiped dry with a chamois or lint-free cloth. Although these wet-sanding papers may be used in place of the pumice or rottenstone customarily applied with a felt pad for this type of finish coat, it must be appreciated that they exert a much faster cutting action, therefore extreme vigilance must be exercised to prevent cutting through the varnish, instead of merely refining its surface.

Whenever possible, sanding should be done prior to final assembly, for after assembly the corners of rails, panels, and joints are difficult to reach. When water stain is to be used later, it is good practice to raise the grain of the wood by sponging it with warm water, allowing it to dry thoroughly before commencing the sanding operations.

The following table is a suggested guide for selecting the grit size of the coated abrasive:

Material	*Abrasive*	*Rough*	*Finish*	*Fine*
Hardwood.............	Garnet Aluminum oxide	2–1	1/2–1/0	2/0–4/0
Softwood..............	Garnet	1½	1/0	2/0

TABLE OF COMPARATIVE GRAIN SIZE

No.	*Garnet*	*Flint*	*Emery*	*No.*	*Garnet*	*Flint*	*Emery*
400	10/0	—	—	80	1/0	1	2
320	9/0	—	FF	80	1/2	1½	2½
280	8/0	—	F	50	1	2	3
240	7/0	—	3/0	40	1½	2½	—
220	6/0	4/0	2/0	36	2	3	—
180	5/0	3/0	1/0	30	2½	—	—
150	4/0	2/0	1/2	24	3	—	—
120	3/0	1/0	1	20	3½	—	—
100	2/0	1/2	1½	16	4	—	—

Chiseling. From his grandstand seat in "Mindy's" restaurant, Damon Runyon, of delightful memory, would have discoursed at some length upon this important subject of chiseling, albeit from a different angle. Among elder cabinetmakers the art of chiseling, or paring with edged tools, was (and still is) held in high repute, since it served to demonstrate their intimate knowledge and

mastery of wood as a medium for expert craftsmanship. Hence they kept their chisels as sharp as surgeons' scalpels, a habit that today's craftsmen would do well to emulate. A standard test for sharpness is to nick or bite into the thumbnail with the chisel.

Professional woodworkers' tool kits usually contain a dazzling array of chisels of various sizes and shapes. For the plain wood joinery contemplated in this volume, however, the discussion will be narrowed to the three standard types, the socket-butt, socket-firmer, and tang-firmer chisels. The socket chisels are generally used for heavy work under a mallet. Tang chisels are restricted to hand-paring, since the handle would be subject to splitting under repeated mallet or side-of-the-hammer blows. Chisels of different widths are desirable, especially where the narrow ends of mortises must be cleaned out into square corners. In general the tang-type chisels are worked with both hands, with the bevel away from the work, as shown in Figure 1.13. The framing and butt chisels, intended for rougher work are habitually held with one hand and driven by a mallet. It is therefore desirable to compensate for the loss of control and consequent danger of undercutting by facing the bevel toward the work, away from the waste being cut out.

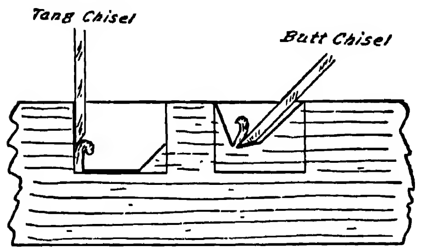


Fig. 1.13. Cutting double mortise with a chisel.

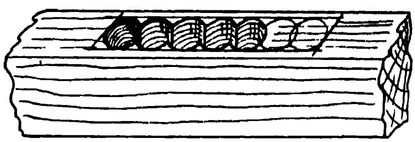


Fig. 1.14. Mortise being bored out.

All chisels should be hollow-ground; for working with hardwoods the bevel should be not less than 30°. This is particularly true of the tang-firmer chisels, which are more efficient when ground to long levels, thus increasing their shearing capacity when rocked back and forth under hand pressure. The short bevels on the socket-butt and socket-firmer chisels add to the wedging effect of the blade, and prevent the cut from opening up ahead of the cutting edge.

In using chisels it is well to follow a regular procedure. The practice nowadays is first to remove all possible waste by sawing or boring, before resorting to chiseling. Regardless of whether this results from our national impatience or our genius for streamlining production, the procedure is a boon to the beginner. In making a mortise for a door lock, for example, the recommended practice is to bore a series of overlapping holes to the proper depth within the scribed area, as in Figure 1.14 and square off the remaining waste with the firmer chisel. When it is

necessary or desirable to scoop out the entire mortise by use of the chisel only, the procedure is as shown in Figure 1.13.

With dadoes, saw cuts can be made by clamping a straightedge along the lines of the intended cut, then sawing to the required depth horizontally. The waste is then chipped out as in Figure 1.15. The same procedure can be followed with the ledges of short rabbets that are not too long for sawing (Figure 1.16). Longer rabbets must be chiseled out as in Figure 1.17. First, the vertical cuts are made with a butt chisel down to the gage lines. The waste is then removed in a series of horizontal chips until the final horizontal and vertical cuts clean out the ledge to its desired level.

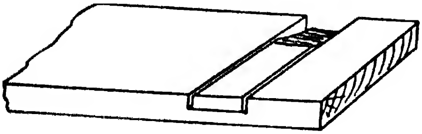


FIG. 1.15. Dado saw cuts being chiseled.

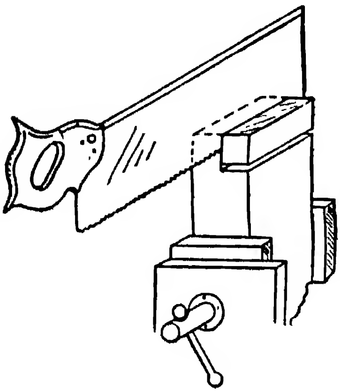


FIG. 1.16. Sawing a rabbet.

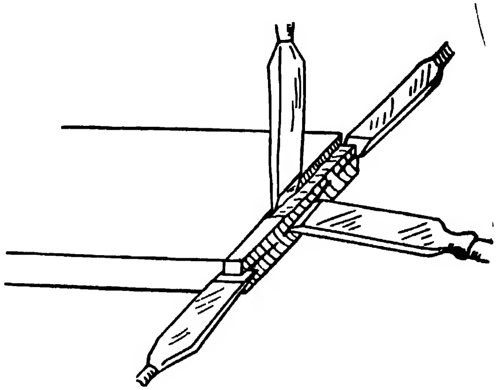


FIG. 1.17. Chiseling a rabbet.

A mortise for a butt hinge is a shallow refinement of the above process, limited by vertical side cuts at right angles to the first vertical checking cut. Cutting a recess with no open side requires a series of bevel cuts within the area outlined by surrounding vertical cuts, as in Figure 1.18. A groove is made by a continuation of this procedure.

Chamfering on side or end grain is not difficult, once gage lines are scored on both sides. The chisel is especially suitable for the gradual slopes at the beginning and end of a stop chamfering. Chiseling off end-grain stock is a true paring operation; the blade should be held so that one corner of the keen cutting edge removes a thin shaving at a time. The guiding hand (Figure 1.19) holds the blade against the work in such a way as to restrict the depth of each cut, thus preventing gouging.

Boring. For all-round use the hand drill is efficient for boring with small or medium-sized bits or drills. For larger holes the woodworker uses a brace, prefer-

ably with a rachet swing. Auger bits vary in diameter from $\frac{3}{16}$ in. to $1\frac{1}{2}$ in., with expansive bits capable of adjustment up to 3 in. Single- and double-twist bits are designed for general woodworking use; the solid-center type is preferred for finer cabinetwork.

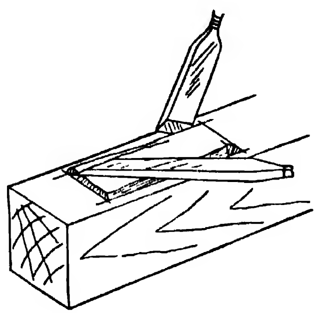


FIG. 1.18. Chiseling a mortise.

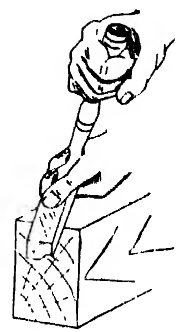


FIG. 1.19 Parting end grain.

To insure that a hole is being bored perpendicularly, it is good practice to stand a try square alongside and align it with the bit by eye, from time to time. When the point of the bit shows signs of penetrating the wood, the work should be turned over and the hole completed from the side, unless a piece of waste stock was first clamped to the underside to prevent splintering. The same procedure is followed in boring long holes, even when a previously drilled block is used as a jig, as in Figure 1.20. It is very difficult to drill long holes accurately, unless one half of the hole is bored from each end.

For drilling uniformly diagonal holes a jig is an essential aid. For example, in borings for the equally splayed or raked legs of an Early American stool, the percentage of outward inclination is first determined in degrees and set up on the adjustable bevel as shown in Figure 1.21. With this as a guide, the hole is bored in a block that will become a jig for each of the equally inclined holes in the stool's top. In the process of boring the jig, a subjig, consisting of two crossed

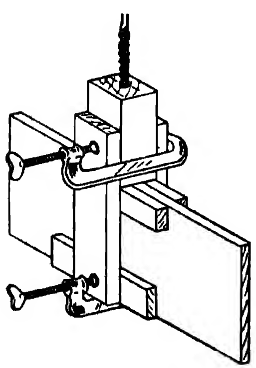


FIG. 1.20. Boring jig on edge of board.

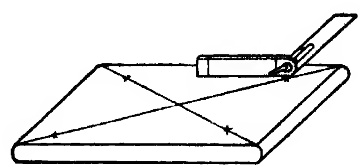


FIG. 1.21. Determining angle of tilt by use of adjustable bevel.

slats or furring strips, pivoted on a nail or screw and secured to the rear wall as a rest for the smooth portion of the bit, will be found useful. When an adjustable, open-sided, commercial miter box is available, an effective jig for boring holes at almost any angle or in narrow stock can be easily assembled. A piece of sheet

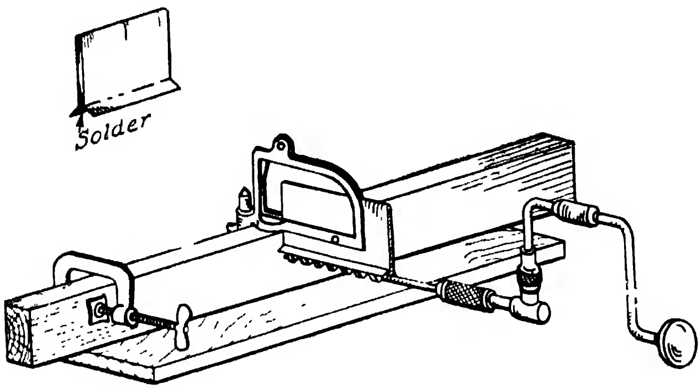
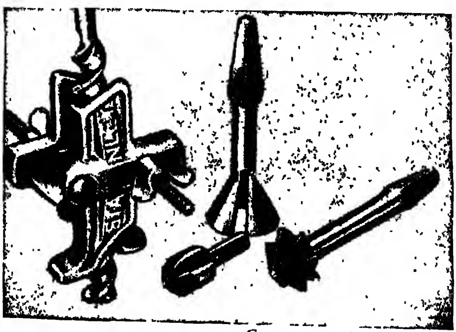


FIG. 1.22a. Jig for boring.

metal 5 in. × 8 in. or 10 in. is folded in the middle and the edges spread apart in a V. A few drops of solder may be required to prevent the leaves from spreading apart. After the work to be bored is clamped in the box, the saw guide is set at the desired angle and the tin jig slipped into the slot in the guide. After the bit has



Courtesy of Stanley Tools

FIG. 1.22b. Bit gage countersinks and dowel sharpeners.

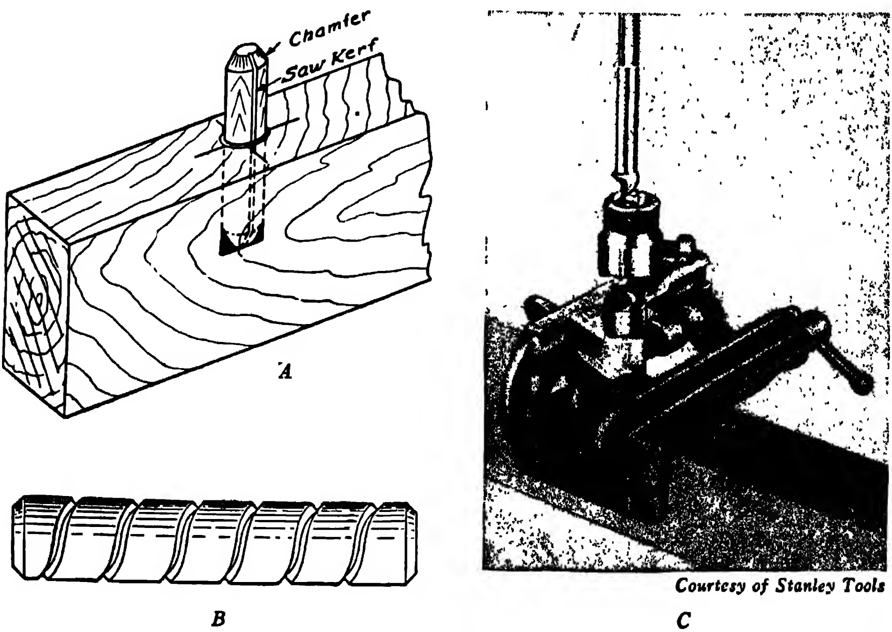
been started, the V groove is pushed down over the bit as a guide, as in A of Figure 1.22. B shows a bit gage, two countersinks, and a dowel sharpener.

Where a series of holes of uniform depth is desired, as in mortising, a stop called a bit gage can be clamped to the bit to prevent it from penetrating beyond

the desired depth, or a stop can be improvised from a length of old garden hose slipped over the bit, or from two pieces of wood bolted together, or even from a piece of paper. It may be desirable, particularly when boring into thin material, to cut a flat-bottomed hole. This calls for a Forstner bit, which has its cutting edges on the circumference of its end. Having no center point, it must be started by its circumference, unless an ordinary auger bit of the same diameter can be used first as a guide.

Tapered holes can be made by boring with a bit whose diameter is equal to that of the small end of the hole, then enlarging the hole with a tapered bit. This is not the same as counterboring, which means that for long screws the first hole, equal in diameter to the root (groove) of the screw, is bored the full length, and then a larger hole is bored for the smooth, larger shank of the screw. Countersinking for concealing or leveling off a screwhead is accomplished by the use of a rose bit or reamer.

Dowels. Usually machined from birch, beech, or maple, doweling rods or pins come in lengths up to 6 ft., with diameters varying from 1/8 in. to 1 in. by increases of 1/16 in. A dowel joint is in reality the reinforcement of other joints, including the simple butt joint—the "granny knot" of wood joinery. Strong doweled joints depend upon carefully fitted holes, accurately aligned and square with adjoining surfaces. Dowel ends are habitually chamfered to prevent tearing and to provide a pocket for the glue (A, Figure 1.23) and are cut 1/16 in. short to



Courtesy of Stanley Tools

Fig. 1.23. Dowels and Doweling jig.

allow for a glue pocket. A saw cut along the length of the dowel will provide an escape for excess glue. Dowels with a spiral channel are available commercially for the same purpose (see B). A doweling jig is shown Figure 1.23 C.

The woodworker who anticipates considerable dowel jointing will save himself much time and trouble by providing himself with a set of dowel plugs. These are short lengths of each of the various sized dowels, equipped with marking nails that have been sharpened as markers after their heads have been filed off. The nails can be centered by drilling a piece of thick waste the size of a short dowel, which is then tapped into the hole. The bit is reinserted in the hole until its point pricks the dowel end, thus marking the center. A hole is drilled slightly undersize to receive the nail at this point.

To cover hidden screws, the heads can be deeply countersunk and covered with a wooden plug, glued in place. In driving the screw home, care must be taken to avoid bruising the edges of the counterbore. A bit known as a "plug cutter" is available for cutting plugs across the grain from identical stock that is slightly thicker than the depth of the hole. Glue is applied to the bottom of the plug and its grain aligned with that of the work, before it is driven vertically into the hole. After the glue dries hard, the plug can be trimmed off, then planed and sanded flush. In French Provincial, English, and Early American reproductions, plugs, with their outer edges chamfered, are often left protruding slightly, to simulate full-length pegs. Much of this early type of furniture also shows pegs flush with the front surface of the piece.

When the work is to be finished with paint, enamel, or lacquer, the heads of countersunk screws and finishing nails can be covered with putty or plastic wood. The filler should be rounded off above the surface of the work to allow for shrinkage. It can be sanded smooth when thoroughly dry. A waterproof, stainproof filler that shows minimum shrinking can be mixed from a measure of powdered resin glue, a measure of wood flour (fine sawdust), and three quarters of a measure of water.

Screws. Although old-time woodworkers scorned the use of any metal fastenings to secure or strengthen the parts of their assemblies, modern furniture makers use screws when the screwheads can be concealed, or leave them exposed where the effect is unimportant. The choice of the proper sized screws for a particular job depends on the thickness of the thinnest piece to be joined and the kind of wood. Too large a screw will split the stock, even if the correctly sized pilot hole was first bored.

Because there are two diameters to each screw, exclusive of the head, two holes should be bored. The first hole, or counterbore, to take the smooth shank of the screw, is bored to the depth of the shank plus the depth of the countersunk screwhead. The second, or pilot, hole, of a diameter equal to the root or groove, is not quite as deep as the threaded portion is long. The head should always be countersunk in hardwood to prevent its wedging effect from splitting the wood.

Soaping the screw first will facilitate driving it in, especially when working with hardwood. The following table gives the gages and diameters of standard screws:

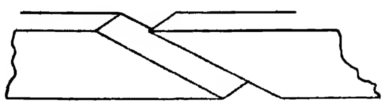
Gage number	4	5	6	7	8	9	10	11	12
Diameter, 1st hole	1/8	1/8	5/32	5/32	3/16	3/16	3/16	7/32	7/32
Diameter, 2nd hole	3/32	3/32	1/8	1/8	5/32	5/32	5/32	5/32	5/32

Screws can be purchased in lengths varying from ¼ in. to 6 in. Lengths from ¼ in. to 1 in. increase by ⅛-in. units; those from 1 in. to 3 in., by ¼-in. units; and from 3 in. to 5 in., by ½-in. units. They come with flat, round, or oval heads, the flathead (FH) type being used for countersinking.

Since the heads of brass screws are likely to break off under strong torque, it is common practice to drive an iron screw in first, replacing it with a brass one after the threads are cut in the wood. For careful craftsmanship, the screwdriver's edge should be kept squared, so that it will sink into full contact with the groove of the screwhead. The edge should also be thick enough to fill the groove, in order to prevent it from slipping out under pressure and gouging the work. The width of the screwdriver's edge should not exceed that of the screwhead, or the wood will be bruised when the head is driven home. It is a sign of good workmanship when exposed screwheads are driven home so that all slots face in the same direction. The various sizes of nails are discussed in Chapter 11.

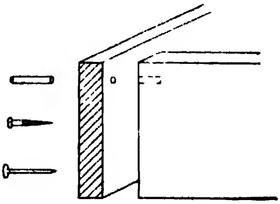
WOOD JOINERY

After this brief survey of elementary woodworking operations, the ambitious craftsman may be assumed to have graduated from the Junior College of Carpentry and be considered ready for matriculation in the University of Wood Joinery. It is well for him to reverence those ancient halls where once such masters as Thomas Chippendale, the Adam brothers, George Hepplewhite, Thomas Sheraton, Duncan Phyfe, and others instructed eager contemporaries in an art whose



Scarf Joint

A



Butt Joint

B

FIG. 1.24.

products were no stronger than their weakest joints. Lest the hesitant neophyte be overcome by the implications of these famous traditions, however, let him be reassured by the fact that, although good joints are indeed the product of careful, unhurried workmanship, they are not necessarily the product of *skill*. The careful planning of a logical procedure—a visualization of the various steps in their proper sequence—and the execution of the plan will insure success for the amateur as well as the expert craftsman.

Lap joints. After the plain butt joint (Figure 1.24), which has two squared surfaces butted together and fastened with glue, dowels, screws, or nails, and the sloping scarf joint (Figure 1.24), which is at best but a compromise, comes, in order of simplicity, the lap or halved joint (Figure 1.25). This joint is easy to

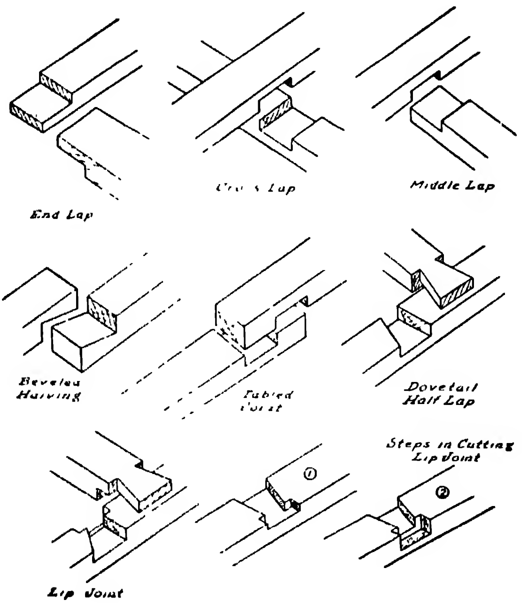


FIG. 1.25. Lap joints.

saw, for as its name implies, it is made by cutting out equal halves from both members so that when united, the joint is flush. When the halved joint is cut from the ends of two members meeting a right angles, it is known as an "end-lap joint." If the members cross each other at right angles near their centers, the joint is termed a "cross-lap joint"; if the end of one member joins the other near the middle, it is called a "middle-lap joint."

In marking lap joints, the best method is to lay one member on top of the other and scribe the exact position where the joint is to be cut; the depth is then marked on the sides with the marking gage. End-lap joints can be cut out entirely

with the back or tenon saw, the vertical cuts being made first; with the cross lap or middle lap, the waste must be removed with the chisel.

For additional strength there is the wedge-shaped, beveled lap that can be entirely a sawing project; the tabled joint and the dovetail half lap are also illustrated. To prevent splitting under the dovetail, the more complicated lip joint is chiseled out as shown in the steps at the bottom of the diagram.

Dado. A familiar joint for supporting shelving or drawer bottoms, the dado (Figure 1.26 a), or housing, is but a deeper, narrower version of one member of

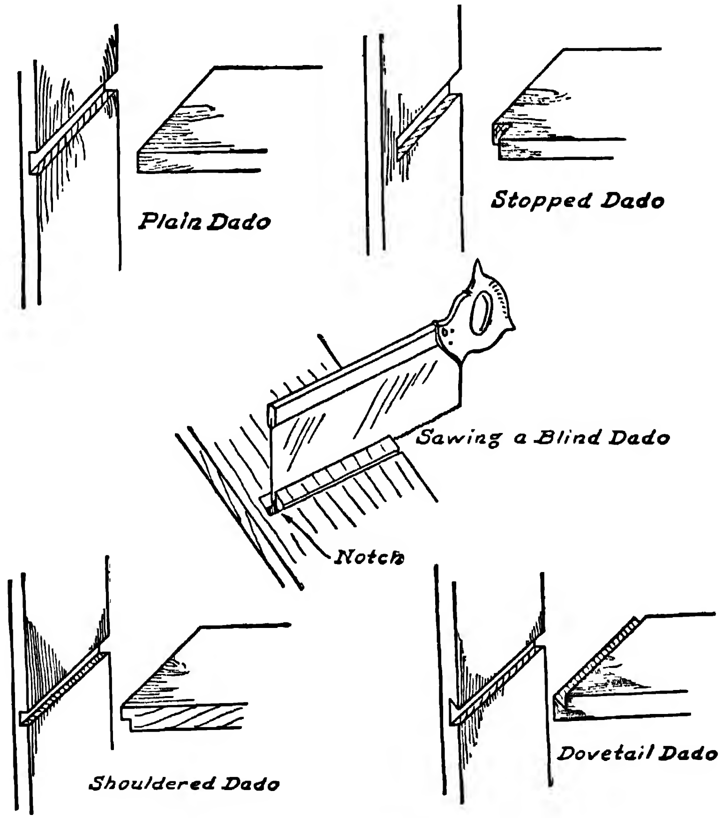


FIG. 1.26*a* Dadoes.

a cross lap; it is, in fact, but a wide groove. When the groove is not extended fully to the face of the vertical member it is known as a "stopped housing"; if the horizonal member is rabbeted, the joint is called a "shouldered housing." To counteract lateral strain the joint may be dovetailed, as shown in the figure; this too may be constructed as a stopped dovetail housing.

Short dadoes across the edges of stock where one member crosses and is sup-

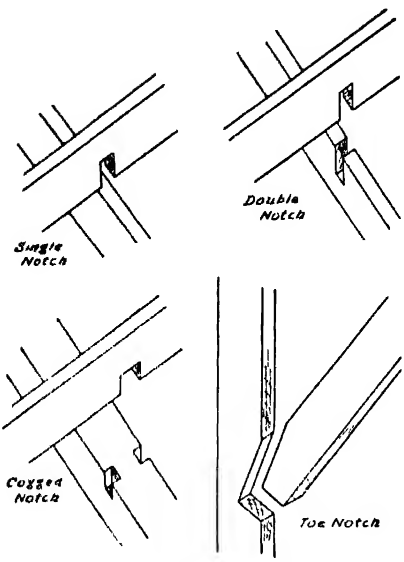


Fig. 1.26*b*. Notching

ported by the other member are known as single or double notching, as the case may be. A modification of this joint, where the lower member is of much thicker material, is the cogged or shoulder notch. A more complicated version is sometimes used to join two heavy members in a wedge halving. A diagonal bracing, termed "toe notching," is sawed out to accommodate the joining of two members at an acute angle.

The simple series of joints called notching is shown in Figure 1.26 *b*.

Miter Joint. As described in the section on planing, plain miter joints can be quickly and accurately sawed in a miter box. Variations shown in the diagram (Figure 1.27) include mitered half lap (on lap miter), the secret tenon miter, and, for maximum strength, the dovetail tenon miter. A favorite method

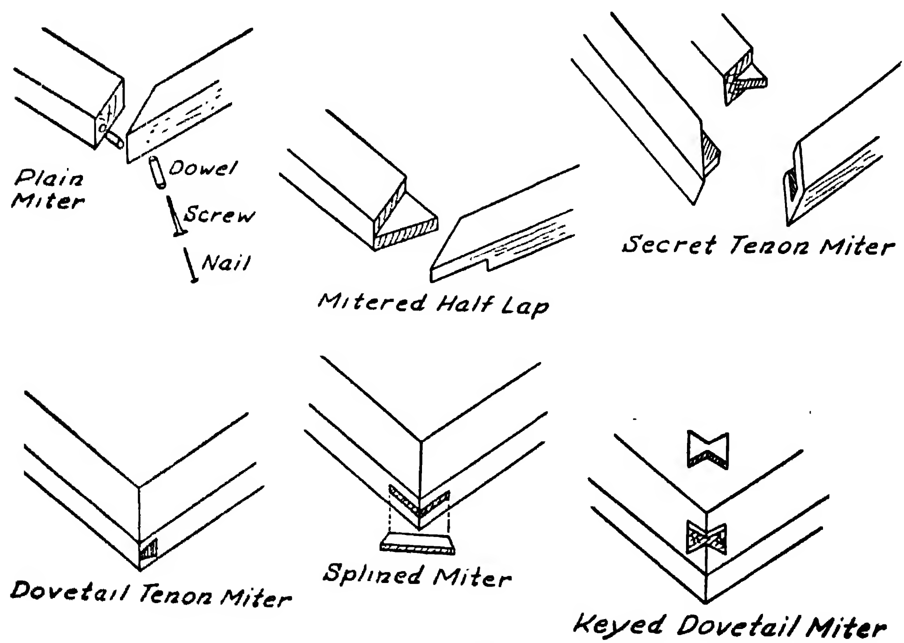


Fig. 1.27. Miters.

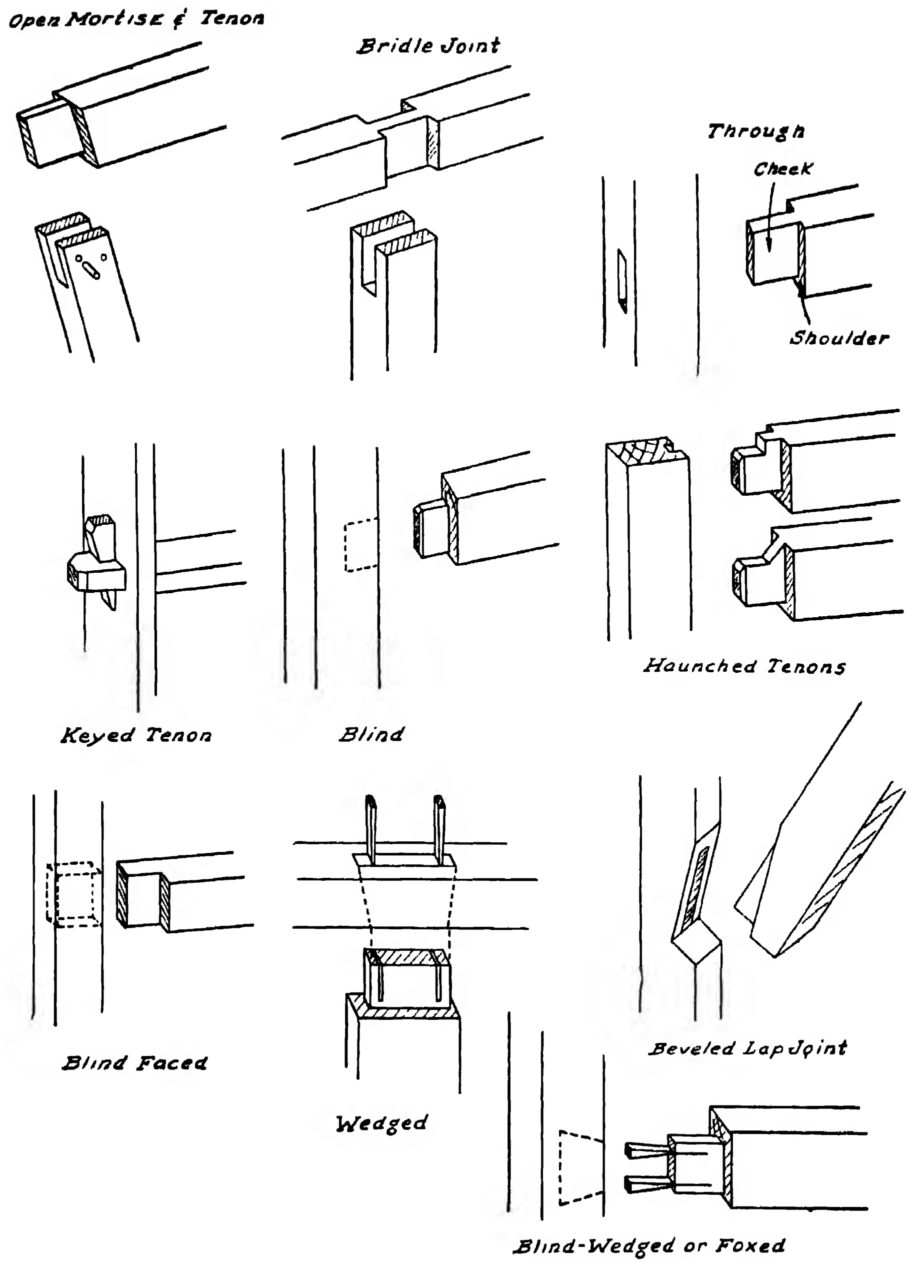


FIG. 1.28. Mortise and tenon joints.

of strengthening the plain miter after it has been glued and while it is still clamped is to saw a groove across the outer angle of the joint into which a "slip feather" or thin piece of veneer can be glued or "splined" in place. Another method of securing the miter is by means of a dovetail key from the underside.

Mortise and Tenon. Although it is one of the oldest joints, the mortise and tenon (Figure 1.28) is also one of the strongest and, therefore, ubiquitous in furniture construction. Both house and cabinet doors use this joint, and table legs are almost invariably joined to their aprons with a mortise and tenon.

The simplest form of this joint and the easiest to cut is the open tenon. Like all other tenons this may be pegged, screwed, or nailed for added security. The bridle joint is another version in which one member is joined near the middle with a form of open tenon.

From a construction standpoint, the simplest form is the through mortise and tenon, where the holes for the mortise can be bored entirely through the member. If preferred, a coping saw can be used to advantage in trimming out the series of overlapping holes. For knockdown furniture the tenon is cut longer than the depth of the through mortise, the protruding extension being drilled to receive a wedge or dowel, set close enough to the outer face of the mitered member to key the tenon firmly in place

In most cases the tenon has one or more shoulders on the side or sides against which the greatest stress is anticipated. For additional strength, when the stock is wide enough, double mortises and tenons are preferred, affording the advantages of two smaller mortises with stiff sides instead of one wide mortise with springy sides. When grooved framing is used, a haunched tenon is cut to fill the gap made by the full-length groove.

To cut a double haunched mortise and tenon, first square the stock, then with a try square lay out the tenon shoulders on all four sides. For the haunch, mark a second line a distance above the shoulder line approximately equal to the depth of the groove, if it is not too deep. Gage the thickness of the tenons on the edges and end, and apply the same gage setting to the mortises in the other member to insure a clean fit. Last of all, gage the width of the tenons on both faces and bore a hole at the base of the center division. The slot between the twin tenons is not cut down entirely to the shoulder in the case of grooved material, for the same reason that a haunch is cut—to give added strength by filling the groove.

From here on, the tenons can be cut out entirely with a hack or tenon saw. The procedure outlined in Figure 1.29 will insure the best results. Sharp corners can be later pared out with a tang-firmer chisel if necessary. The ends of the tenons are chamfered for the same reason that the ends of blind dowels are rounded.

The mortises can be first bored out with the auger bits gaged to stop at a depth about 1/16 in. deeper than the length of the tenons, to accommodate surplus glue and imprisoned air. The bit should be 1/16 in. narrower than the tenon to

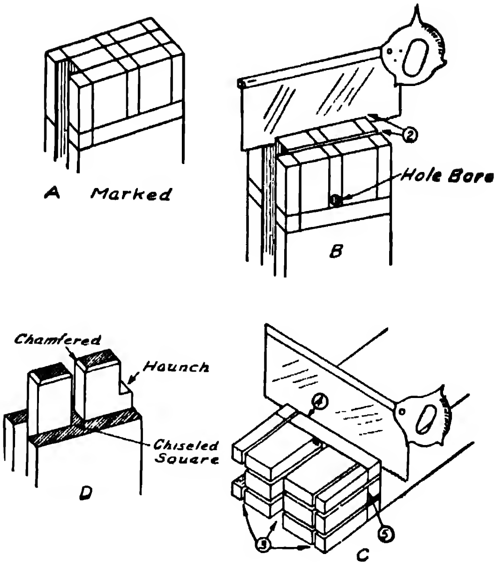


FIG. 1.29. Steps in cutting double haunched tenon from tongue and groove stock.

insure a snug fit after chiseling, in order to provide thorough bracing support and to relieve the glue from excessive strain. The fit of the tenons in the mortises should not be so tight as to bulge them, however.

A through tenon can be wedged for added strength, as shown in the diagram (Figure 1.28). In this case, as well as in that of the blind-wedged tenon, the mortise must be cut slightly fan-shaped at its extreme end to accommodate the butt ends of the wedges.

Perhaps the most useful of the mortise and tenon joints for furniture construction is the mitered tenon, used to secure the maximum length of the two tenons meeting at corner mortises. These are common joints for securing the aprons of tables to the legs, and are nothing more than two haunched single or double tenons with their ends mitered as illustrated in Figure 1.30 *a*.

A beveled shoulder joint is used in place of the beveled lap joint where it is desired to conceal the angled tenon of the diagonal member.

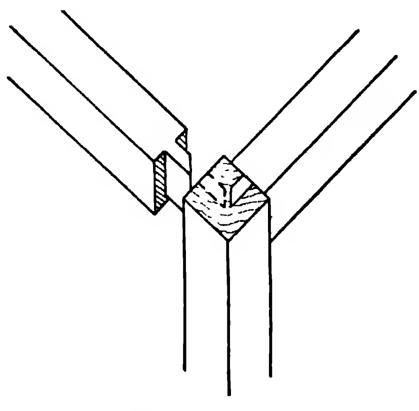


FIG. 1.30*a* Mitered mortise and tenon.

Dimensions. A good rule for calculating the proper dimensions of a tenon is to proportion it so that it is one third the thickness of the rail of which it is a part, and of a width not more than six times its thickness. Wider tenons weaken the mortise and should be divided into double mortise and tenons.

In designing furniture, or following drawings or instructions that omit the dimensions of tenons, the following proportions are recommended:

Rail thickness, in inches	5/8	3/4	7/8	1 1/8	1 1/2
Tenon thickness, in inches	5/16	3/8	3/8	1/2	5/8
Tenon length, in inches	3/4	1 1/4	1 1/4	1 1/2	1 3/4

Drawboring. A tight mortise and tenon joint can be assured without the use of glue and clamps by recourse to a jointing operation known as "drawboring." This is accomplished by boring the holes for the pins, pegs or dowels through the empty mortise, after which the tenon is inserted and marked through the center points of the holes.

When the tenon is withdrawn from the mortise, however, the holes are drilled slightly nearer the tenon's shoulders than indicated by the marks. By driving in a tapered peg or pin, the tenon will be drawn up tightly against its shoulders and held there firmly, without recourse to glue, as shown in the cutout, Figure 1.30 *b*.

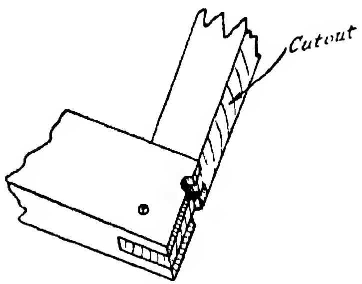


FIG. 1.30*b*. Drawboring a mortise and tenon joint.

Corner Joints. (Figure 1.31). The simplest joint for uniting two members on edge at right angles is the rabbet joint, most often encountered where a plywood panel is joined to the back of a cabinet by nails, screws, or a small molding. It is also found in the back joining of inexpensive drawer construction.

The box corner is a better joint for a rear corner of a drawer, for it consists of a dado in the side member and a rabbet in the rear member. For a front corner of the drawer, a simple form is the milled corner, which permits the front to cover the ends of the side members.

The lock miter joint, a standard drawer joint, is schematically diagramed on the basis of a front piece 3/4 in. thick and a side member of 5/8 in. thickness. The steps in its construction are clarified when the sequence of steps illustrated in the succeeding joint is studied.

By far the most efficient of the corner joints is the lock joint, which resists separation from both directions. It is a popular joint in cedar chests, but at first glance may seem too complicated for the amateur wood jointer. When the sequence

of cutting is carefully analyzed, however, it will be discovered that it consists of nothing more than a series of the familiar dadoes and rabbets, accurately measured to interlock when assembled. As shown in Figure 1.32, the first cut is a dado or groove $\frac{3}{16}$ in. wide and $\frac{3}{16}$ in. deep cut so that its top edge is $\frac{5}{8}$ in. up

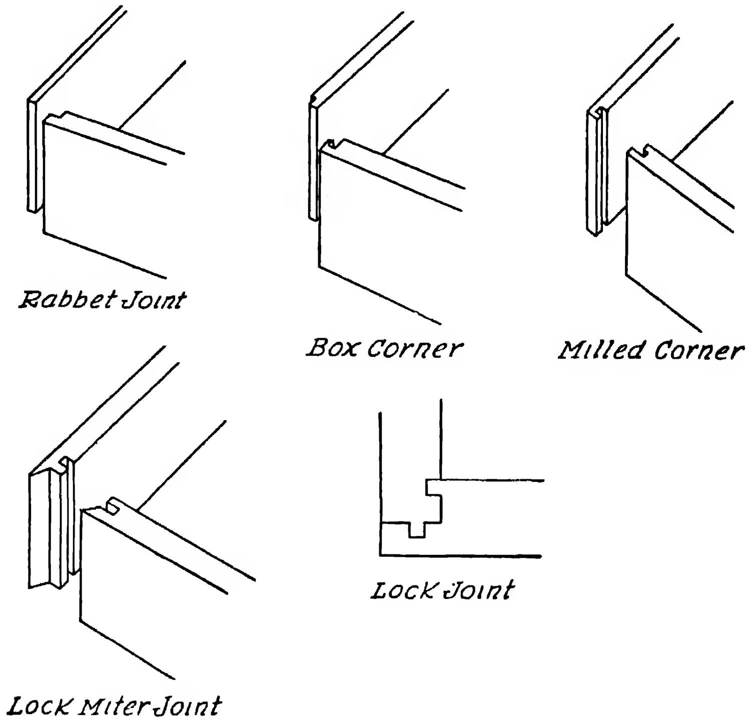


FIG. 1.31. Corner joints.

from the bottom of the member edge, after which a $\frac{3}{16}$-in. rabbet, $\frac{3}{16}$ in. deep is cut at the bottom. A $\frac{1}{4}$-in. rabbet cut from the opposite side will leave a $\frac{3}{16}$ in. x $\frac{3}{16}$ in. tongue projecting.

In the front member a $\frac{1}{4}$-in. dado is cut $\frac{3}{16}$ in. down from the top or inner face to a depth equal to the thickness of the side member, in this case $\frac{5}{8}$ in. As illustrated, the top or inner side of this dado is now cut off $\frac{3}{16}$ in. from the bottom. If the work has been carefully done the two pieces will interlock, and, when glued, will require no other fastenings.

To complete the survey it should be remembered that blind dowels can be employed, with or without mitered corners. As previously stated, some Early Georgian pieces make no attempt to conceal frontal peggings.

Lock miter and rabbet and miter joints are included in the plate for informa-

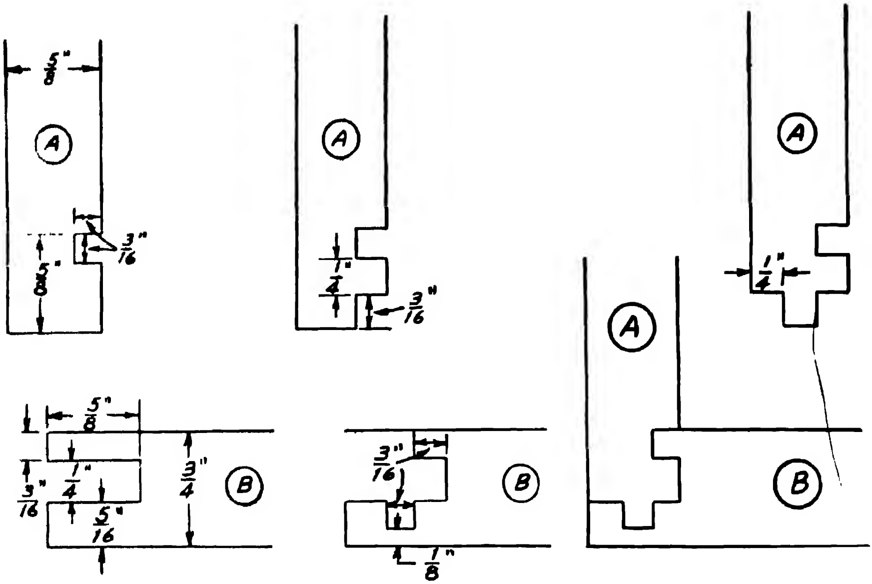


FIG. 1.32. Lock joint

tional purposes. Their construction with hand tools requires some ingenious clamping and jigging.

Dovetail Joints. Perhaps one of the strongest of joints in fine cabinetmaking is the dovetail joint (Figure 1.33), because it resists separation in every direction but the one from which the tenons were inserted, and even this weakness can be eliminated by gluing or pinning. As a corner joint, the dovetail is considered a mark of good workmanship because its close fit is achieved at the price of accurate, painstaking labor and craftsmanship. Although such a joint might be considered a postgraduate cabinetmaker's subject, yet the enthusiastic woodworker will probably attempt its construction at some time in his career. Its precision of fit is obtained by an elementary set of measurements, carefully executed.

Since the open, or through, dovetail is in reality but a modification of the mortise and tenon joint, the first question facing the uninitiated is: Which are tenons, or pins, and which are the mortises, sockets, or dovetails ("tails")? On a drawer, it is obvious that the dovetail joint must be so cut that it will withstand separation when the drawer is pulled out by its front. Therefore, the wider, fan-tailed mortises, sockets, are on the sides to hold the (often) narrower tenons, or pins, of the front member against withdrawal.

Single through tenons are useful when edging drawing boards or work-table tops or for jointing stiles to upper drawer rails. To insure a strong joint the tail (mortise) is generally cut so that it is 4/10 of the width of the member along the

depth line. The sides of the tail generally slope 1 in. in 6 in. The procedure is a simplification of the methods explained in the following paragraphs.

A finger (or box) joint consisting of the series of multiple square tenons and mortises is familiarly observed at the corners of small boxes such as honeycomb containers. A multiple through dovetail, however, is a horse of another color.

Certain general rules can be profitably applied to the art of dovetailing. In the first place, the pins may be smaller than or equal in size to the tails, but in

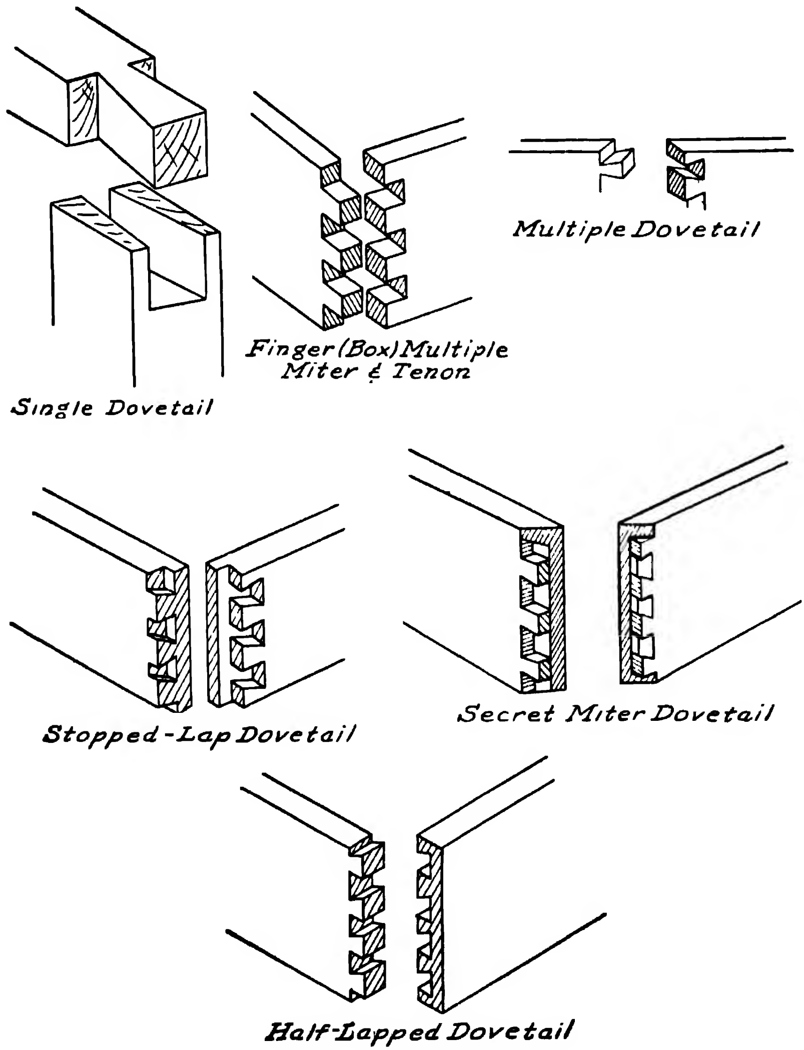


Fig. 1.33. Dovetails.

softwood are customarily wider than in hardwood construction. For hardwood a good rule to follow is that the thickness on the (widest) face of the pins shall be approximately three fourths of the thickness of the wood. It is also good practice to insure that the distance from center to center of the pins is more than twice and less than three times their width. In laying out muliple through dovetails, the two outer or end pins are usually scaled down to half size, plus 1/8 in. for necessary strength. Both pins and sockets can be of equal width if desired, although, as previously stated, many craftsmen prefer the thinner pins—approximately one third of the width of the sockets at their wide ends. Pin widths are seldom cut less than 1/4 in. wide, however.

For the purpose of laying out a series of sockets, let us assume a drawer front 7/8 in. thick and 7 1/2 in. wide, with the mating side 1/2 in. thick. The first thing to do is to check to see that both ends are accurately squared. Since it is the side member that is to be cut into sockets or tails, it is first necessary to estimate the number of pins to be cut in the front. On the basis of a 7/8 in. thick drawer front, pins 3/4 of this thickness in width would average about 5/8 in. on their faces. For the distance between centers, if the mean of 2 1/2 times the width of the pins is selected, the resulting measurement will be 1 9/16 in., which when divided into the 7 1/2-in. width of the drawer goes approximately 5 times, that is, 5 centered spaces or sockets. However, there is to be a half pin at either end of the joint; therefore there will be but 4 full pins in all.

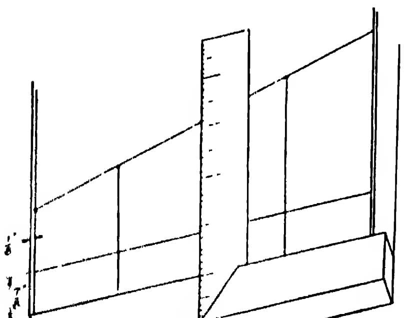


FIG. 1.34 Laying out a dovetail.

Since a pin of half thickness is usually too thin for safe cutting, it is customary to add an extra 1/8 in. at each end to strengthen these half pins. Accordingly, two lines are drawn 1/8 in. in from each edge of the side member to represent the centers of the end sockets, as in Figure 1.34. The depth of the pins is, of course, equal to the thickness of the drawer front, or 7/8 in., and this distance is squared off along all four sides of the side member. Many craftsmen prefer to add 1/16 in. to both pins and tails to form projections that can be dressed flush after final assembling and gluing.

In order to divide the space between these two outer center lines, a ruler is laid diagonally across the space until it is readily divisible by 4. By means of a try square at the joint or outer end of the piece, parallel lines are brought down to intersect the outer edge of the member, marking the centers of the four pins. Because the width of a pin at its narrowest or deepest point is rarely less than 1/4 in., a convenient width such as 5/16 in. is centered astride each of the parallel guide lines where it crosses the edge of the board (Figure 1.35). At the depth of

the socket the maximum thickness of 5/8 in. is next centered and connecting lines scribed between the joint edge and the back line to form the complete pin. An alternate method is to mark only the width of the pin along the board's edge; then, by setting and clamping a bevel to register a slope of 1 to 6, the parallel sides of all pins are projected across the depth line. The bevel is then turned over and the other sides are marked and later joined horizontally across the center lines.

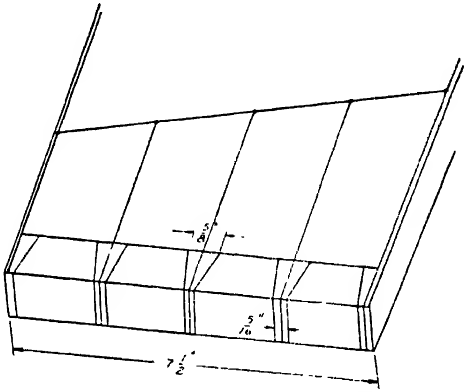


FIG. 1.35. Completed layout for dovetail

When several dovetails are to be layed out, a convenient device for speeding up the work is the T square shown in Figure 1.36. A 1 in. x 3 in. piece of 3/16-in. transparent plastic or celluloid has 1 in. of one end accurately cut or filed on each side to a ratio of 1:6. This is fastened with 4 screws at a measured right angle to a squared block of hardwood 5/16 in. x 1 in. x 4 in. The use of this T square will be greatly facilitated if a baseline upon which to proportion the average width of the tails (or pins) is squared off on the member to be measured, midway between the first depth line and the end of the board. The parallel spacing lines are then projected across or down to this baseline, indicating the average width of the tails. If the T square is applied at this point, no further measurements will be required.

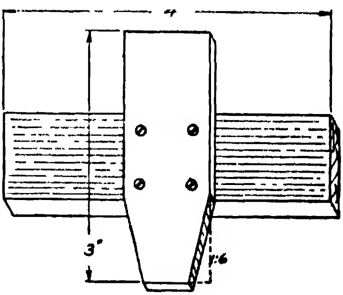


FIG. 1.36. Dovetail T-square.

The actual cutting of the tails is as simple as sawing a double tenon. For the mechanic who has mastered the brace and bit, it is feasible to bore the proper sized holes at the depth of the tails. Then after clamping the piece vertically in a vise, the sides of the tails can be sawed with a backsaw. The socket bottoms can be finished off with a coping saw or chiseled across, cutting halfway through one

side of the stock at a time. For a perfect fit the *saw kerfs must always be cut in the waste material.*

The dovetailed piece of drawer siding is now used as a templet for laying out the pins on the drawer's front edge. The dovetailed member is held firmly at a right angle while the tails are traced to outline the pins. The depth of the pins is equal to the thickness of the drawer side, in this case ½ in. Mark and cut as for tails. When several dovetails are to be cut to the same size, the members of each set of pins or tails can be clamped together and sawed out at one time.

Although the preceding instructions were based on a drawer whose carcass was jointed with through dovetails, such a joint is seldom encountered in the front of a drawer. Instead the pins and tails are camouflaged by one of the three methods shown in Figure 1 33. Half-lap dovetails are cut so that the side members lock into two thirds or three fourths of the thickness of the drawer front. Except for diagonal saw cuts along the sides, the mortises in the front members must be chiseled out, after they are scribed from the tails, as in through-dovetail layout. Half pins are essential for a finished appearance at the top and bottom.

In a stopped dovetail the tails are cut only part of the way through the thickness of the side member, so that the pins are concealed in the final assembly. In this case the pins are cut first, to be used as a templet for the stopped tails.

A more satisfactory method of hiding the mortises in a dovetail joint is by means of a double-lapped dovetail, which fits together in the form of a rabbeted corner with the stopped pins in the drawer front leaving a sufficient projection of the front edge to cover the half end grain of the sides.

The height of perfection is achieved in the construction of the secret miter dovetail, as illustrated. This precise example of fine cabinetmaking, like the other modifications noted above, must be chiseled out, with the exception of the miter saw cuts that joint the shoulders, followed by triangular kerfs sawn as in the stopped-lap dovetail.

GLUING

Glue is a fastener that penetrates the entire surface of the wood, forming tiny tongues that lock into the microscopic mortises or pores between the fibers. Unlike nails and screws, which bind two pieces of wood only at single points of contact, a good gluing job literally welds the pieces together with a strength usually greater than that of the members forming the joint. For successful gluing, (1) the glue must be good; (2) the joint must fit accurately; (3) due allowance must be made for shrinking; and (4) pressure must be properly applied for a sufficient time.

Animal glue. Professional cabinetmakers have long favored hot animal glue, originally because of its relatively short drying time as well as for its suitability for rubbed joints. Animal glue comes in sheets and in crushed or powdered form. It is heated in a cast-iron glue pot in the form of a double boiler. Such a pot can be improvised from a tin can, with its top cut off flush, fitted into a larger can with space for the hot water. Bits of brick, stones, or small angle irons on their

sides should be placed in the bottom of the large can to separate the two bottoms. The glue is placed in the smaller receptacle, covered with water, and allowed to soak from 3 to 8 hours, until it swells to a jellylike mass without liquefying.

When the glue is to be used, the bottom section of the glue-pot assembly is filled with sufficient water and the glue is heated to about 150° F., being stirred the while but not with sufficient force to produce air bubbles. A good glue will give off no objectionable odors while being heated.

When the glue becomes creamy and drips from the stirring paddle in long strings, it is ready for use. It should be maintained at room temperature thereafter until the work is completed. In using hot glue the wood should be warmed first to prevent chilling the glue into setting before pressure can be properly applied. Animal glue is not waterproof.

Fish Glue. Fish glue comes in liquid form, which is especially useful for the occasional worker because haste in its application is not required. In fact, after it has been brushed on to both of the surfaces to be joined, it is permitted to stand for a few minutes to observe whether excess absorption will require further touching up before the joint is permanently assembled. Although not as strong as animal glue it is excellent for softwoods. Fish glue is not waterproof and may require warming during cold weather.

Casein Glue. Casein glue has become increasingly popular in the home workshop, owing to its strength and quick-setting and slow-curing properties. It comes packaged in powdered form with full directions for mixing it with *cold* water. Since it sets within 4 hours, only enough should be mixed for the job on hand. It should be applied like liquid (fish) glue, and the clamps should be put on within 20 minutes. The result is a waterproof, heat-resistant joint, stronger than the wood itself. Casein glue will deteriorate when exposed to salt water or the action of molds. Latest reports indicate, however, that glue can be made resistant to mold in warm, wet, tropical climates, by adding 5 per cent of an organic mercury fungicide-bactericide to the dry glue; before the wood joints are bonded together, one side is treated with a diluted formaldehyde solution.

Plastic Glue. Plastic glue also comes in powdered form to be mixed with cold water, according to directions. Unlike casein glue, however, the mixture will last longer—about 6 hours at 70° down to 45 minutes at 100°; in hot weather the life of the mix can be prolonged by setting it in cold water. It is heat resistant up to about 150° F. and waterproof to both fresh and salt water.

Resin-type plastic is an excellent, waterproof adhesive, which comes in two forms. The full-strength liquid plastic is syrupy and light colored, and requires the addition of a hardening agent just before being used. This is made by adding C.P. hydrochloric acid, 3 volumes to 1 volume of distilled water, well stirred in a glass or porcelain container. A thin layer is brushed on both surfaces to be joined, before pressure is applied. At room temperature from 4 to 12 hours will be required for full hardening. This time can be reduced to about a half hour if the work can be heated to 150° F.

Emulsified plastic consists of a thin, white suspension of plastic in water and is slower setting and subject to more shrinkage than the full-strength liquid.

Clamps. Good glued joints cannot be achieved unless subjected to sufficient pressure while the glue is setting. Woods of ordinary densities require from 100 to 200 lb of pressure per square inch or, roughly, 1 bar clamp per foot for edge-glued stock 1 in. thick. Close-grained hardwoods require greater pressure. The pressure, however, must not be great enough to distort the wood. Although weights, ropes, chains, or wedging in frames can be employed, the old stand-bys are the hand screws, C clamps, and bar clamps.

The hand screw is the oldest form of clamp and, when thoroughly mastered, is quite versatile. To open its jaws evenly, the handle of the middle spindle (nearest the jaws) is grasped with the right hand and the handle of the end spindle in the left hand, jaws facing outward. Hands rotate in a clockwise manner as the jaws are swung down and toward the operator until the desired opening is obtained. When being applied to the work, the middle spindle adjusts to the work size, then the end spindle applies the pressure until the jaws are parallel.

Face-to-face gluing requires heavy, equalized pressure, and may utilize any or all three types of clamps, depending upon the sizes of the members to be bonded. When wide boards are to be joined, small brads tapped into one member and snipped off short will prevent creeping. Top and bottom bearers or battens can be used with hand screws or C clamps at both ends, when bar clamps are not available. Dowels are very useful for reinforcing boards glued face to face.

In selecting the sides to be glued it must be remembered that the sap side tends to cup because it contains more moisture than the heart side. Therefore, in face-to-face gluing the sap sides are joined with the grain parallel—never at right angles. Since the force exerted by shrinkage is tremendous, it is unfair to expect glue to perform a miracle. In view of this, whenever possible, lumber should be cut roughly to size and planed several days before the actual gluing is to take place.

Edge-to-edge gluing will be more successful if heart and sap pieces are alternated, so that whatever shrinkage results will produce a slight waviness, rather than a deep bulge. Bar clamps are convenient for securing this type of glued

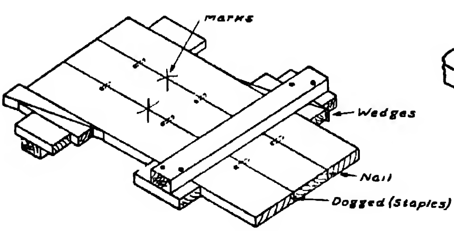


Fig. 1.37. Improvised bar clamps.

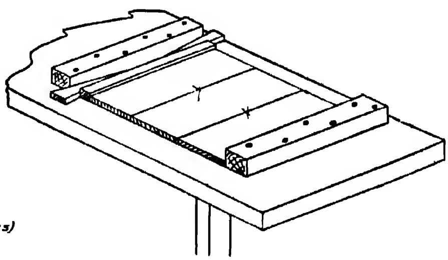


Fig. 1.38.

joint, with large hand screws or C clamps and bearers along the edges. Bar clamps may be improvised, as shown in Figure 1.37 or, if a heavy bench or table top is available, a frame of 2 x 4's can be screwed to the flat top and the work wedged into place, as illustrated in Figure 1.38. In all cases, the boards being glued must be kept flat with suitable wedges, to prevent their arching under pressure. Before the glue is applied the edges should be checked carefully against the light to insure that the ends meet closely. A slight bulge in the center will be rectified by the clamps.

End grain can be glued provided it is first sized with a weak glue solution to prevent suction. By thus filling the pores the final, extra-thick glue coat will not be too much absorbed. An end-grain glued joint is weak at best, and where conditions permit, a scarf joint should be substituted. For hardwoods the slope of the scarf should be approximately 15 times the thickness of the stock.

Framing is the classic example of "cramping" operations, and is of prime importance in furniture construction. As in all gluing procedures, the first step is to assemble the parts "dry," to see that the fit is exact. At this time a thorough check for wind and surface flatness should be made, and a test for squareness carried out by means of diagonals and the try square at each corner.

After the glue and clamps have been applied, if the work leans or twists in any direction, the clamps must be shifted or screwed in that direction for the necessary correction, or a long bar clamp may be applied as a diagonal. In all cases the clamping action must parallel the true pressure line.

Miter gluing is an art in itself and various jigs can be devised to secure a well-glued joint. There is a simple miter clamp commercially available that gives excellent results when it is possible to bore half holes in the back of the miter. Other satisfactory homemade jigs will be explained later under picture frame construction in Chapter 2.

In general, joints in hardwood should remain clamped 2 or 3 hours longer than those in softwood. The minimum drying time depends upon the room temperature and the type of glue, with the casein and plastic glues setting in from 4 to 7 hours. A full 12 hours of setting will insure a sound fit. At least 24 hours should be allowed for seasoning.

Finally, it must be realized that although glue will fill gaps it cannot be relied upon to tighten loose-fitting joints, because it cracks when hardened in the air. Because of the shrinking and expanding effects of temperature on wood, panels should never be glued in their grooves, nor should the shoulders of tenons be touched with the glue brush. Successful gluing operations are insured when the clamps are opened to their approximate size before the even film of glue is applied to both members of the joint. Waxed paper used freely under the jaws of clamps will prevent sticking as the glue dries.

COPYING PATTERNS

Working drawings show the shape of curved or scrolled parts by graphing out that portion of the design into equal squares, as shown in Figure 1.39. Since the legend indicates that each square measures 1 in. on a side, a full-sized pattern can be laid out in squares of the indicated size. The points where the lines of the pattern cross the horizontal and vertical lines of the graph or squares are spotted on the drawing and transferred to the full-sized pattern. By connecting these spots the design is reproduced. When only half a pattern is graphed out into squares, the opposite, identical portion can be reproduced by folding the pattern over.

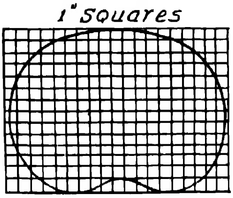


Fig. 1.39. Enlarging by squares.

To enlarge the drawing, or distort it into a different proportion of length to breadth, it is only necessary to extend the baseline and one side to the required distance and mark off a graph whose spacings total those in the original drawing. The reverse is, of course, true when a drawing is to be reduced in size.

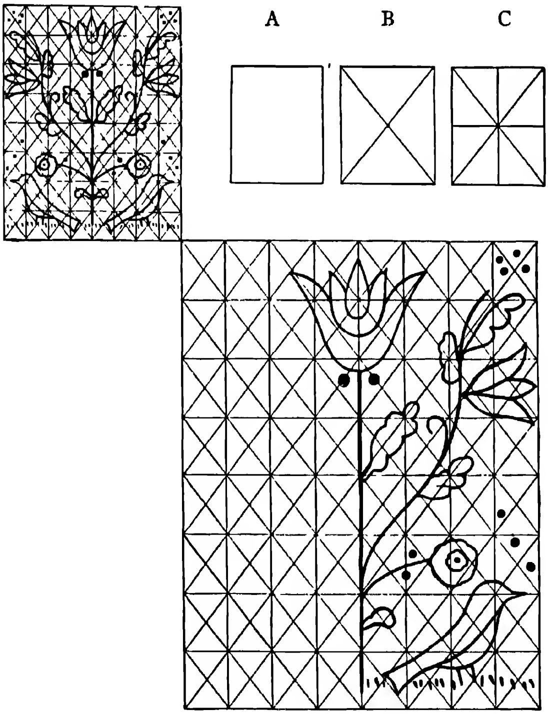


Fig. 1.40. Enlarging a complicated pattern by use of a diagonal.

Where the detail of a drawing is rather complicated, the diagonal method will often be found to be a speedier means for accurate copying. This is because two diagonal lines are added to the horizontal and vertical lines to intersect a greater number of curved and irregular lines in the original matter, as shown in Figure 1.40. Although these diagonals can be added to the simple graph squares, it may prove more desirable to outline the original design with a square-cornered "frame" whose sides measure in units easy to multiply or divide. The corners of frame A are then joined by diagonals, as in B, and then the centers of the top and bottom and sides are joined, as in C. This process of subdivision is continued wherever the detail in the design requires additional intersections.

To enlarge or reduce the pattern the baseline and one side are extended the required distance, and the main diagonal projected as shown. Thin tracing paper can be used where it is undesirable to mark the original material.

The photographic enthusiast who has access to an enlarger can "blow up" small-scale drawings to a required size by tracing the original drawing on translucent tracing paper. With this tracing as a negative the enlargement can be retraced by hand on a piece of wrapping paper, or it can be printed on paper in a darkroom, or directly on the wood, metal, or fabric to be worked if it is first coated with Multimulsion.

To enlarge for tracing only, a simple mirrorscope can be constructed using any available lens, a mirror, and a light source. In Figure 1.41 a wooden box with an

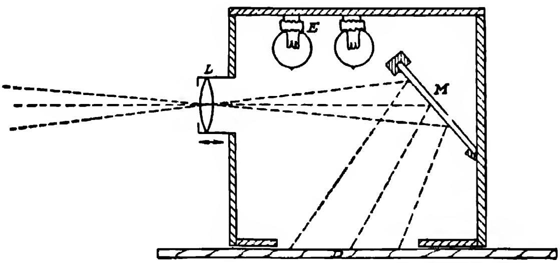
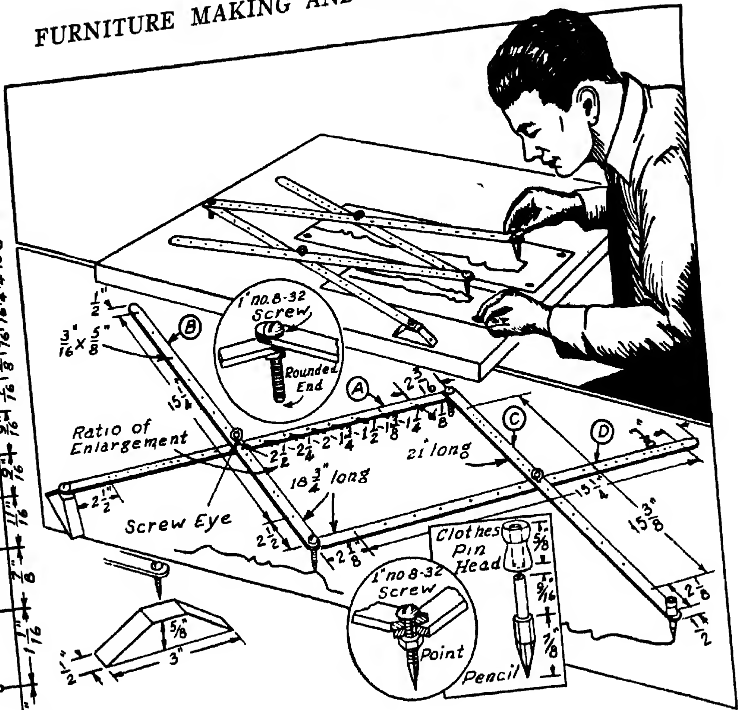


Fig. 1.41. Mirrorscope.

opening in the bottom for the material to be copied (D), has a mirror (M) fastened at an angle that will project the image through the lens (L), fastened in place over a hole opposite the mirror. The box should be high enough or wide enough to permit the installation of an electric socket (E) for a high-watt bulb.

Last but not least of the enlarging or copying devices is the old reliable pantograph. From Figure 1.42 it is clear that the construction of this contrivance is merely a matter of accurately drilling the four hardwood strips to the identical spacings shown in the detail. This is done with the four strips clamped together before their ends are trimmed off, so that the first holes in strips (A) and (B) are 2½ in. from the centers of the larger holes at the end where strip (A) is pivoted



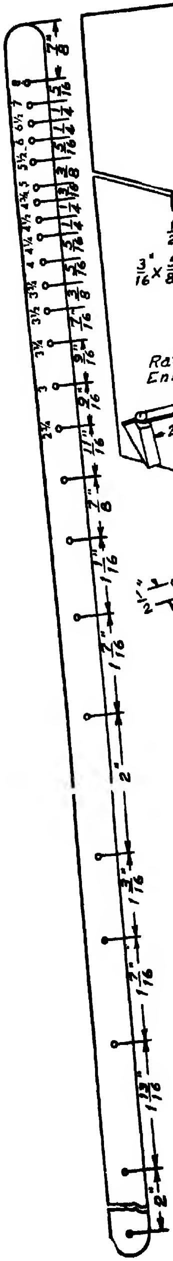


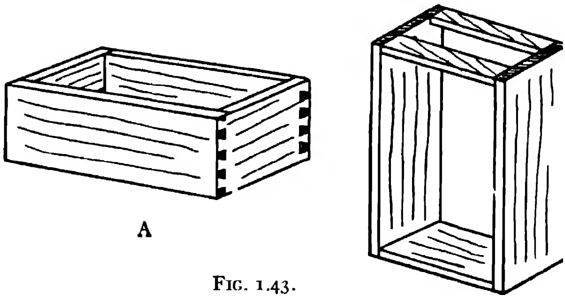
FIG. 1.42

to the block, with the end of strip (*B*) holding the tracing point; and 2⅛ in. from the centers of the larger holes for the pencil in strip (*C*) with the tracing point in strip (*D*). As will be observed from the drawing, the ends of strips (*B*) and (*C*), where the holes are closely spaced, are connected to the ends of strips (*D*) and (*A*) where the holes are widely spaced.

FURNITURE CONSTRUCTION METHODS

Almost every article of wooden furniture is put together in one or a combination of three main methods of construction. These elementary forms have come down through the ages as arrangements of the grain in the various pieces to insure that the whole assembly shrinks or swells together.

The first method is that of carcass or box construction as shown in Figure 1.43. In drawer A the grain of each piece is horizontal, so that



A

FIG. 1.43.

B

if shrinkage takes place to any degree, there will be no danger of the parts splitting. In the same way the boxlike carcass or case B will shrink from front to back. As already described, the dovetail joint is the most satisfactory corner joint; it can be lapped where concealment is desirable, along the sides of the case.

The second method is stool construction, pictured in Figure 1.44. The rails are jointed to the legs with strong mortise and tenon joints. The mortises meet in the thickness of the leg, thus giving the mitered tenons maximum length. Doweling is the alternate method employed in much fine furniture, though it is not as strong as tenons are. Stools, chair frames, and table frames are of this form of construction with the main corner posts continued to the top.

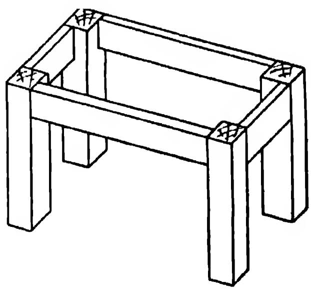
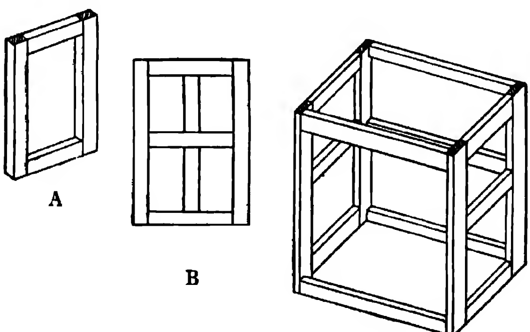


FIG. 1.44.

The third form, frame construction, illustrated in Figure 1.45, was evolved to avoid the bad effects of shrinkage. When the framing shown in Figure 1.45A is filled by a wood panel, the panel is inserted into grooves or rabbets without gluing. This permits it to shrink without affecting the framework. A wide frame can be



A

B

C

FIG. 1.45.

reinforced as shown in Figure 1.45B. When applied to the framework of cabinet C, this method of construction in reality consists of joining two side frames together by front and side rails in mortise-and-tenon joints. Such a cabinet will not shrink from front to back.

To a great extent plywood has modified the necessity of compensating for shrinkage and swelling in large surfaces. However, when solid stock is used, precautions must be taken to prevent damage to the finished product. In addition to designing and assembling a piece so that the grain of the parts lies in the same plane, narrow widths should always be used in preference to wide material. This procedure is based on the recognized principle that shrinkage, in general, is proportional to width. Hence, glued-up members, when properly assembled with alternating heart and sap pieces, will exhibit considerably less shrinkage than single wide boards.

AVERAGE DIMENSIONS OF TYPICAL FURNITURE

Type	*Description*	*Width, in inches*	*Depth, in inches*	*Height, in inches*
Bed	Twin	39	72+	19–24
Bedside table	One or two drawer	15	19	27
Butterfly table	Each leaf 10¾ in.	34	34	24
Chair, dining or side	Back 34½ in. high	Seat front 17½; back 14½	16½	18
Chest, linen	Cedar-lined	18½	45	23
Chest of drawers	Four drawers	40	20	37
Coffee table	Rectangular	18	26	18
Console	Half-round top	32	16	30
Corner cupboard	Colonial	33	—	72 or more
Desk, kneehole	Leg space 20 in. × 24 in	24	44	29
Dining table	Seats six	36	52	29
Dressing table	With mirror, 1 to 3 drawers	20	36	30
End table	Rectangular	14	21	24
Floor lamp	3 legs, table shelf	18	18	50
Gateleg table (oval)	Center 3½ in. wide, each leaf 12¼ in.	28	32	29
Lamp table	Round or octagonal top	18	18	27
Magazine rack	Floor	12	18	18½
Pembroke table	Center 15 in. wide, each leaf 7½ in.	30	15	26
Sideboard	Georgian	72	22	38
Stool	Early American	14	20	15
Tilt-top table	Round top	26	26	28
Writing table	One drawer	26	60	28

Another cabinetmakers' device to reduce the deadly enemy of change in the wood fibers is the sliding joint. The unglued plywood panel housed in its dadoes in the surrounding rails is a good example. The elder cabinetmakers were well aware of this expedient, and their heavy slab tables will often be found with the rails, or cleats to which the legs are fastened, dovetailed into the table top in a sliding joint. The present-day methods of using angled metal fasteners to secure table tops to slots in their aprons (C of Figure 2.23) is nothing more than a mechanization of the sliding joint. The same tolerances are afforded by elongated holes when the pocket-screwing method, illustrated in Chapter 2, (page 78) is used.

Calculations

Areas of surface:

Triangle	=	base × altitude
Parallelogram	=	base × altitude
Trapezoid	=	½ sum of parallel sides × altitude
Circle	=	radius squared × 3.1416
Ellipse	=	long diameter × short diameter × 0.7854
Regular polygon	=	½ sum of its sides × perpendicular distance from the center of the polygon to one of its sides
Cylinder	=	sum of areas of both ends + circumference × height
Sphere	=	diameter squared × 3.1416

2

INDOOR FURNITURE CONSTRUCTION

THE designs included in this chapter have been carefully chosen to represent a cross section of the various methods of furniture construction employing the fundamental operations described in the preceding chapter. Within sections, the projects are graduated from examples of relatively elementary workmanship to those requiring more advanced craftsmanship. Although all are considered to be well within the range of average ability, the amateur cabinetmaker is advised to select the simpler projects first, progressing step by step to more complicated joinery according to his demonstrated abilities. Opportunities for machine-tool construction are present in all projects, and many turned patterns can be included by the craftsman who possesses one or more woodworking machines.

Few suggestions are included as to the kind of wood to be employed. The selection is left to the worker, whose decision will be influenced by the intended use and the finish of the article he plans to construct. Kitchen, bedroom, nursery, and bathroom furniture is often painted and can therefore be constructed from close-grained softwoods. The choice of hardwoods depends upon the other furniture in the room, the design of the piece, and the availability of the desired stock.

As we saw in the preceding chapter, the aristocrats of furniture woods are mahogany, walnut, and maple, with gumwood an excellent substitute. Mahogany is automatically associated with Chippendale-like turnings and carvings; walnut is reminiscent of Queen Anne styling and is very popular for modern designs; native maple was a favorite in colonial days and is therefore most suitable for Early American and Colonial designs.

In the early stages of his cabinetmaking the beginner will do well to make use of yellow poplar as an all-round medium for workshop practice. Of low cost and general availability, it is soft and easy to work. It is variously known as poplar, cottonwood, and whitewood, and is sometimes confused with certain species of the tulip tree.

Plywood is a modern composition that has become increasingly popular among

cabinetmakers in direct proportion to the increase in its tensile strength and the variety of exposed surfaces offered. Various plywood designs are offered in a later section of this chapter.

The dimensions tabulated under the lumber list in each project are the measurements of the finished stock including all tenons, tongues, curves, and so on. By decreasing height, width, and length, the worker can make children's furniture; by increasing or decreasing certain measurements, he can build a piece to fit a restricted space. When such measurements are being changed, however, care should be taken to maintain the proportion inherent in the design.

FOLDING SCREENS

Depending upon the type of covering or finish employed, the construction of folding screens can be so simplified that an astonishingly workmanlike, ornamental, and useful article can be produced by the beginner. The first project selected is such a one, employing as it does not only the simplest of wood joints by the most inexpensive of materials.

Wallpaper Screens. The customary height of folding screens is that of the average person 5 ft. 8 in. tall. In a screen of this type the framework is to be entirely covered; therefore the cheapest quality of lumber can be employed provided it is properly seasoned.

LUMBER LIST
(for one frame)

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	1½	68	Stiles
5	¾	1½	13	Rails

The construction of the frames, which can be from three to six in number, affords the amateur craftsman an ideal opportunity to practice a variety of simple joints. Inasmuch as the entire frame will be concealed, the only requirements are that the joints shall be flush, square, and firm.

The easiest joint for such a project is of course the butt joint. It can be fastened in place by two 10-penny finishing nails driven through the stiles into the rails, provided the latter are soft enough to resist splitting. If all five rails are clamped together, squared, and cut at one time there will be no difficulty about their fit. After the top and bottom rails are nailed in place it is a simple matter to insert the center rail, and then center the other two rails in the remaining spaces 15⅛ in. apart (Figure 2.1).

Butt joints are the weakest of all joints because the end grain of one member

The drawer guides are cut to fit between the front legs and corner braces, as illustrated. The drawer runners can now be glued and clamped into their rabbets in the rail.

In the meantime the drawer parts can be cut and fitted. As shown in B of Figure 2.37 the 27-in. front is cut into 7/16-in. pins 5/8 in. deep, with a 3/16-in. lap for concealment. The tails are 7/8 in. at their wide ends. A 3/8-in. dado is cut 1/4 in. up from the bottom of the back of the drawer front to accommodate the plywood panel, that slides in to form the bottom. The sides are 16 1/4 in. over-all with two wide tails as shown, dadoed for the drawer bottom. The 3 1/2-in. back-piece clears the bottom of the drawer, which is fastened to it with brads.

When the leg joints have dried, the spreader can be glued and attached with countersunk screws to the gateleg apron's extension, as shown in A, Figure 2.36 *b*. The drawer rail with its attached runners can now be glued and pegged into place between the front legs, after dowels in the rear of the drawer runners have first been glued into their holes in the inner (rear) apron. The underframe is now squared up carefully before the right rear corner of the inner apron is butted against the right side apron and glued and screwed to the right rear leg and the spreader. Check the corners again for squareness before clamping.

The main top of the original table is attached to the three stationary legs by means of square plugs in the tops of the legs with a peg in the apron of the fourth corner; the gateleg apron is flush with the back edge, and there is a 5 3/4-in. overhang at the ends. Better construction would be to cut the legs 3/4 in. longer to permit wedged tenons to project through the table top. Half-inch dowels, however, will be suitable, although it may prove desirable to pocket-screw the aprons to the underside of the table top for additional security.

The filler strips and drawer guides can now be screwed in place, a wooden or brass knob can be bolted to the front of the drawer, and the table is ready for finishing.

Butterfly Table. A most useful type of occasional table that can double as an end table, or, when opened up, a 30-in. coffee or cocktail table, is one equipped with sturdy drop leaves. A classic example is the Colonial-styled butterfly table (Figure 2.38), which has maintained its popularity down through the years.

First the legs are spokeshaved, chiseled, and filed, or lathe-turned to the simple pattern shown in Figure 2.38. Since they are to be slanted to a 96° angle at the ends, and two mortises must be cut in each leg at this angle, it will expedite matters to build a simple jig (detail B) for boring out the mortise holes. This consists of a 4 1/4-in. block with one surface sloped to the proper angle, fastened, tapered face up, to a piece of square stock with a stop block at its opposite end to accommodate the 21 1/4-in. table leg. This will permit boring out both the apron and stretcher mortises to the same angle, 1 in. deep. Mortises for the side aprons and stretchers are cut in the usual manner at right angles to the legs, which tilt in one direction only. All mortises are cut to provide a 3/8-in. offset for the legs at the front.

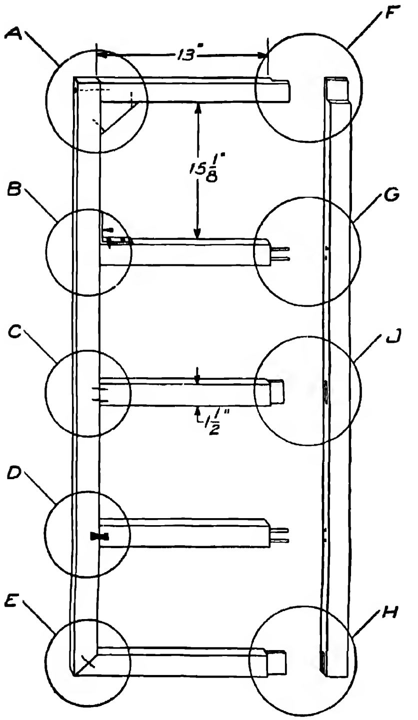


FIG. 2.1.

(in this case the rail) offers a minimum of purchase for nails, screws, or glue unless one or more dowels are inserted. Therefore six bracing blocks are cut with their long edges parallel to the grain of the wood. They are glued inside the four outer corners of the frame and to the top (or bottom) corners of the central stile as shown in A, Figure 2.1 and fastened with two 8-penny nails. The blocks not only will prevent the 10-penny nails from pulling out of the end grain of the stiles, but will also insure rigidity at the important corners. If preferred, angle irons can be screwed inside the corners instead of the blocks, as shown at B. A still simpler method of construction is illustrated in detail C, Figure 2.1, demonstrating the use of corrugated fasteners to hold the butt joints tight. With the joint clamped together two of these sharp-edged fasteners are hammered down flush with the faces of the two members. Scotch fasteners (detail D) have the same effect, but will project above the surface of the joint somewhat, even in soft wood. Neither of these time savers will afford the rigidity of bracing blocks.

Accurately mitered joints (detail E) can be fastened with nails, corrugated fasteners, or dowels. Lap joints are pictured in detail F. They can be glued and nailed, pegged, or screwed tightly in place. For the woodworker who enjoys doweling, the jointing of the interior as well as the outer rails to their stile presents an excellent opportunity for practice. The dowels should be small enough in diameter to permit the use of two at each joint in order to prevent twist, as shown at G.

An open mortise and tenon (detail H) could be used effectively at the corners, held together firmly with glue and countersunk screws or dowels. Unless the wood is very soft, however, to attempt closed mortise and tenon joints (detail J) for the interior rails might invite the disaster of splitting. No matter what joints are employed, it is essential to the success of the project that each joint shall be true and that the uprights remain parallel, free from twist or wind.

With the frame completed, a piece of wrapping paper 18 in. wide and 70 in. long is now cut and laid on the bench or floor. Available glue or paperhanger's paste is applied to one side of the uprights and stiles; then the frame is pressed

down upon the paper, a 1-in. lap being allowed on all edges. A tab (detail A, Figure 2.2) is cut in the paper at each corner, glue is spread along the entire lap, and the paper is then folded up along the edge of the frame and tacked in place at wide intervals.

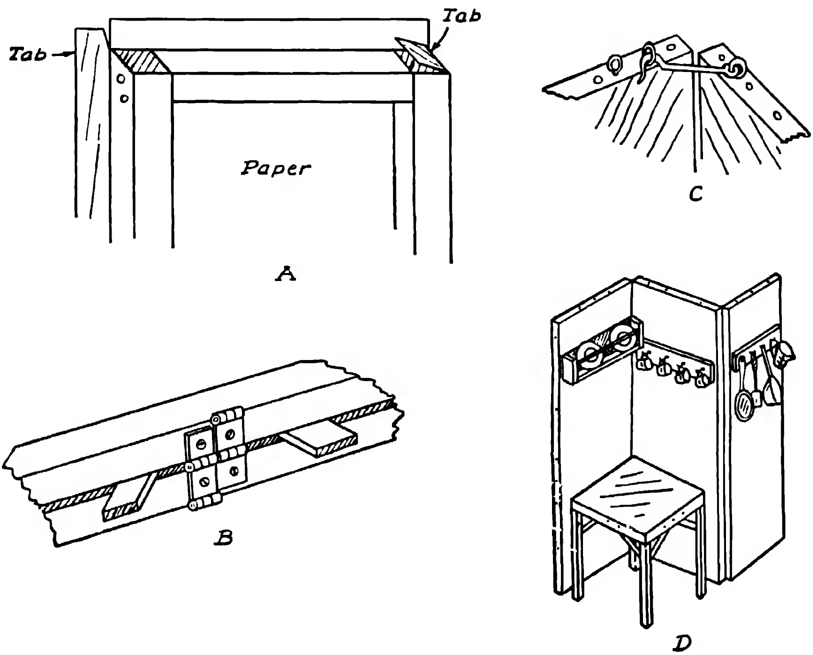


FIG. 2.2.

A second sheet of paper is fastened to the other side in like manner, after which procedure both sides are lightly moistened with water by means of a sponge or a cloth. This will tighten the paper smoothly when it dries; too much water may cause it to split. The frame is now ready for the application of the wallpaper, which should be chosen with care. In general, it will be found that a design that features fairly large figures will prove more pleasing than a small pattern. Furthermore, for ease in cleaning, it will prove desirable to apply a thin coat of clear shellac to the wallpaper, which, however, tends to darken its tone.

Since standard wallpaper is 18 in. wide, it can be lapped over the edges of the frame in the same manner as was employed in attaching the wrapping paper. While it is being worked out smoothly with a soft, clean cloth it will be noticed that the wrapping-paper liner will tend to loosen and wrinkle. As the paste dries, however, it will tighten as before.

When the wallpaper on both sides has dried, the edges can be trimmed

and painted a contrasting or matching color. A more secure method is to glue on upholsterers' gimp, fastening it with matching tacks at 3-in. intervals.

Double-acting hinges are mortised into the edges of the frames. The panels should be separated by small wedges when the hinges are being fitted into the gains, with due allowance for the thickness of the covering material and tacks, as shown in Figure 2.2 B. The bottom edge of the frame when not fastened with upholsterers' tacks can be raised from the floor by inserting dome casters at both corners.

Leatherette Screens. In place of the wrapping-paper and wallpaper covering, leatherette can be used if preferred, by tacking down the first side with flatheaded carpet tacks, overlapping it with the second side, which has been cut long and wide enough to double it under and secure it with upholsterers' tacks, or gimp and tacks. This type of covering must be stretched tight in much the same manner as screen wire when applied to an inflexible frame. The ends are first tacked as tightly as possible, then the sides.

Wallboard Screens. For a stronger screen, beaverboard, smooth wallboard, or plywood panels can be cut to fit the outside measurements of the frames and glued in place, with a few invisible brads inserted for added security. The edges are trimmed flush all around, sanded, and painted. The faces of the panels can be painted, stenciled, decorated with decalcomanias, glued labels, photographs, shells, or wallpaper.

Oilcloth and Chintz Screens. In kitchens, bathrooms, or nurseries it may be more desirable to use an easily cleaned oilcloth of harmonizing design and colors. Glazed chintzes, which match a room's draperies, slipcovers, or pillows are exceptionally effective, and for durability may be first lined with a tightly stretched frame covering of unbleached muslin or other suitable material.

Utility Screens. When space is at a premium and it is desired to conceal an extemporized kitchenette or washstand, light plywood strips supporting hooks can be attached to the rear of the screen, or plate and utensil brackets of doweling can be screwed to the frames as suggested in detail D, Figure 2.2. In the latter case it will be advantageous to stagger the rails to prevent constant wear and tear to the outer surface of the screen's panels. Rails may be in pairs at such points, or wider lumber can be used. Hooks and eyes, shown in detail C, Figure 2.2, will hold such screens firmly open.

At the cost of a little additional effort, the horizontal line at the top of the screen can be softened by the addition of a curved member along the top edge of the center (or all) sections as illustrated in Figure 2.3. If not too deep, these curved portions may consist of separate pieces sawed out with a compass saw, jigsaw, or band saw and attached by means of 10-penny nails or dowels, as in detail A, Figure 2.3. The better practice is to use a single piece of wider stock for the upper stiles, as in B, Figure 2.3. An interesting treatment of a three-section screen is to slope the curves up toward the taller central section as pictured in C, Figure 2.3.

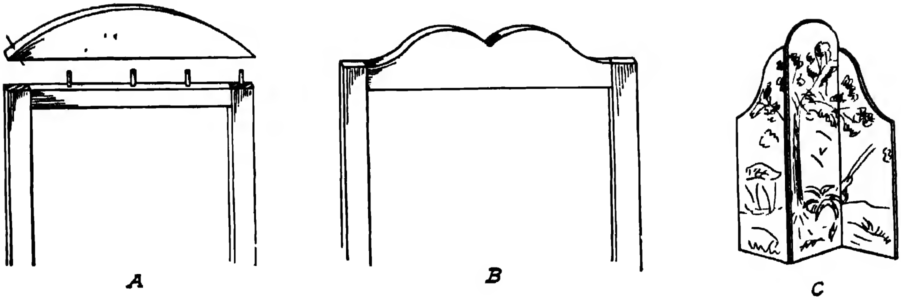


Fig. 2.3.

Plywood Screens. For the cabinetmaker who has access to rabbeting or dadoing planes or equipment, the construction of a screen with an exposed frame holding plywood panels will prove a worth-while project.

Such a screen can be constructed, however, of narrow tongue and groove flooring strips with the tongues ripped off and planed down. The uprights are cut the same length as those of the wallpaper screen with grooved sides inward, facing each other. The top and bottom stiles are haunch-tenoned into the uprights, with

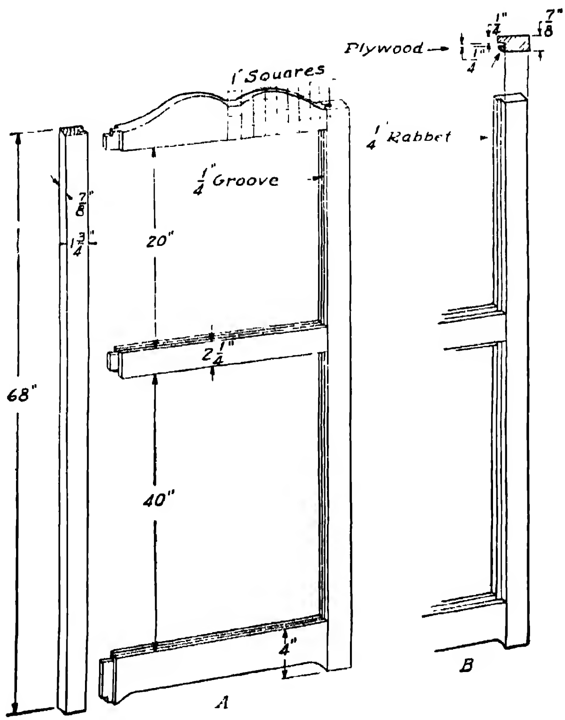


Fig. 2.4.

the grooves toward the center of the frame. The interior stile, tenoned two thirds of the way up in the frame, must have its tongue replaced by a groove to receive the plywood panel. Panels are cut and fitted into the grooves of the frame before the tenons are fastened and glued. No glue is used on the panels.

A more workmanlike job would include curved top stiles and varying widths in the interior and bottom stiles. The framing should be at least ⅞ in. thick, with widths as shown in Figure 2.4. The inside of the stiles are grooved (detail A) or rabbeted (detail B) to take the plywood plus quarter-round moulding. After their positions are marked on the uprights the latter are rabbeted and the frame glued together with mortise and tenon joints (or dowels). The plywood panels are held in place by the mitered strips of moldings, glued and bradded into place.

Tapestry Screens. If desired, the panels can be covered by a favorite tapestry, embroidery, or other material. In the interest of economy, as well as minimum depth for the rabbet, beaverboard or heavy cardboard can be substituted for the plywood when the surface is to be concealed by fabrics or other materials.

Nautical Screen. For the marine rumpus room, porch, or boy's den, wider stiles and rails of well-grained wood are doweled, or mortise and tenoned, so that sailcloth or unbleached muslin can be whipped taut with white cotton rope as shown in A, Figure 2.5. Metal grommets are riveted into the four hems of each of the panels, which can be stenciled with appropriate salty designs.

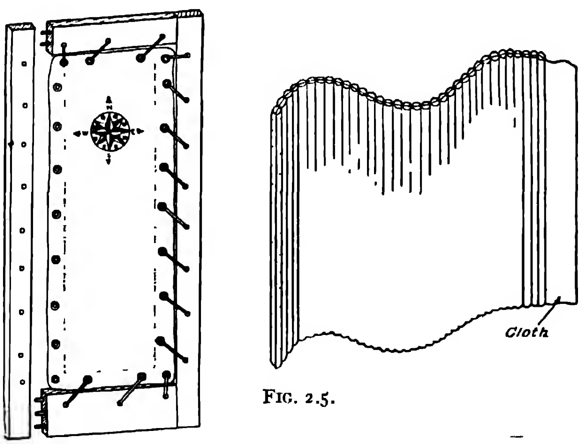


Fig. 2.5.

Serpentine Screen. A folding, or more properly "roll-up," screen, which can be set up in smoothly flowing semicircles to form serpentine, rounded effects, is easily constructed from half-round moldings glued to light canvas or unbleached muslin.

Identical moldings of 5 ft. 8 in. or other suitable length are glued to the fabric, front and back, so that their edges coincide, as if they were completely rounded dowels (see B, Figure 2.5). This is important if the screen is to "hinge" between

moldings. For additional security the moldings are bradded together at tops and bottoms. It is well to brad the first and last pair at intervals throughout their lengths.

The resulting screen can be painted to match the other furniture, or the trim of the room. If desired, a design can be painted on either or both sides, as is illustrated in the screen at the far end of the room in Figure 10.9 of Chapter 10.

PICTURE FRAMES

With the variety of moldings available at most lumber yards it requires only a bit of care on the part of the home craftsman to enable him to construct his own picture frames. In fact, a large amount of the accuracy required in cutting and fitting the sometimes tricky miter joint can be eliminated by using the combination miter board and clamping jig shown in Figure 2.6.

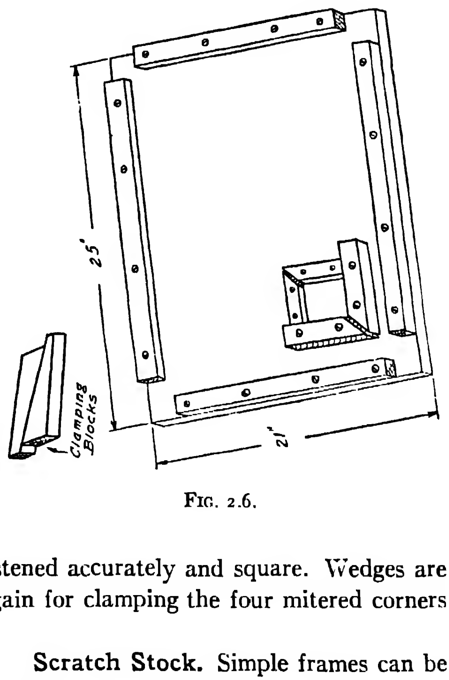


FIG. 2.6.

Miter Board and Clamp. The dimensions of the jig will of course depend upon the sizes of the frames to be constructed. To accommodate an average-sized picture with mat, measuring approximately 10½ in. x 14⅞ in., a piece of heavy plywood or glued-up stock 21 in. x 25 in. will suffice. Outer cleats of 1½ in. to 2 in. hardwood are screwed around the four sides as shown in the diagram. At one corner, oak strips are screwed down to form the miter board. These strips must be cut and fastened accurately and square. Wedges are inserted when the miters are cut, and again for clamping the four mitered corners after gluing.

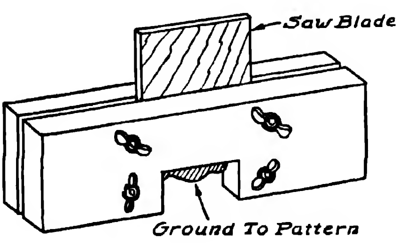


FIG. 2.7.

Scratch Stock. Simple frames can be beveled or rounded with a hand plane. Beading and other designs can be gouged out of close-grained hardwood with a homemade scratch stock, shown in Figure 2.7. This tool must be "made to order" for the size of the molding it is to shape. It consists of two hardwood blocks notched to the width and thickness of the molding, between which is clamped a

piece of old saw blade, which has been filed or ground into the desired shape. The blade is held tightly by six bolts with wing nuts, and pushed away from the operation against the clamped molding. Commencing with a shallow cut, the blade is lowered successively to increase the "bite." Sanding is required for a smooth finish.

If the molding is to be shaped, it is preferable first to cut the rabbet for the glass in the back. Should the molding be too thin to take a rabbet, thin strips can be glued and bradded ¼ in. to ⅜ in. from the inside edges to form ledges.

In cutting the miters in the miter block the main requirements are tight wedging and accurate measurements. If the opposite sides of a frame are not exactly equal in length, the corners will never come out square. To allow for the miter, in measuring the length of a molding, twice its width must be added (minus the rabbet) to the over-all picture or glass size on that side. If a faulty miter is cut, it can be repaired by clamping it tightly at a known right angle and making one or more saw kerfs through the joint to even up both sides.

As the miters are cut and "dry-fitted," it is well to number them in pencil, after the cut surfaces are sanded. A thin sizing coat of glue should be applied to close the end-grain pores.

For light frames, picture-frame nails, in addition to the final glue coat, will suffice. Waxed paper should be placed under the joints before the jig is glued and clamped in. In heavier frames, corrugated fasteners driven into the rear can be used, provided the molding is thick enough.

Dowels are necessary reinforcements for heavy frames, and slip feathers or splines of veneer (Figure 2.8) have great holding power. Grooves for the latter type of joint consist of a saw kerf through both members when they are clamped together as shown. The grain of the feather or spline should be at right angles to the miter cuts.

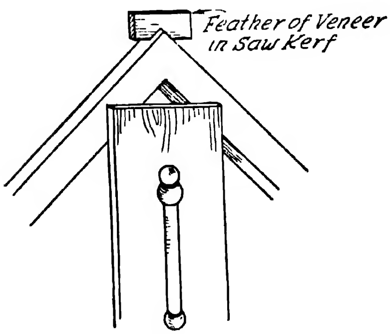


FIG. 2.8.

Finishes. The finish of the frame depends on the kind of wood employed, the color scheme of the room, and most of all, the picture itself. If a clash with other hues can be avoided, an interesting treatment is to select a dominant color or shade in the picture as the principal color for the frame. When the frame is beaded, an inner band of silver or aluminum paint is another pleasing variation suitable for many framings. Gilt, bronze, and silver paints are standard finishes.

Three-Dimensional Effects. When duplicate pictures or photographs are available, interesting depth effects can be obtained by the use of an additional sheet of glass. First a piece of glass the same size as that already cut for the frame

is laid over the picture and its mat, as it will appear in the frame. Then the central, foreground part of the picture is cut out and pasted on the second glass sheet directly over the same figure in the glass-covered picture. All that remains is to cut the rabbet in the back of the frame deep enough to receive both pieces of glass, the mat, picture, and backing, as in Figure 2.9.

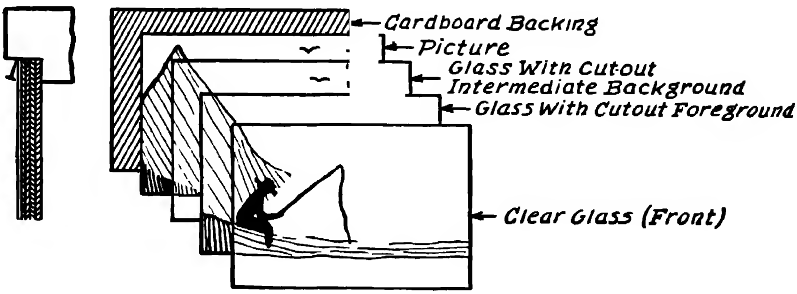


FIG. 2.9. Three-dimensional pictures.

Even deeper relief can be secured from three identical pictures, with objects in the intermediate background cut out and cemented in their proper positions on a third piece of glass, midway between the other two.

Trays. Heavy frames holding triple-strength window glass make excellent serving trays when backed by light, felt-covered plywood that has been glued and bradded, or screwed, to cover the entire back of the frame. The best practice is to cut a second rabbet to the depth of the plywood, ¼ in. inside the outer edge of the frame. A picture, design, or piece of colorful fabric can be inserted between the glass and the backing, and simple handles screwed into the ends.

PLYWOOD PROJECTS

Plywood panels, made up of thin layers of wood glued together with the grain of one at an angle (as much as 90°) from the other, have proved a boon to cabinetmakers. Fabricated with one or both sides veneered with a wide selection of beautifully grained woods, these panels vary in total thicknesses from less than $\frac{1}{16}$ in. to as much as 3 in. They come in wallboard lengths up to 4 ft. wide.

Compared with solid wood, the advantages of plywood lie in its near equalization of strength properties along the length and width of the panel, its resistance to checking and splitting, and its indisposition to change dimensions with changes in moisture content. These advantages result from alternating the direction of grain in successive plies. Since the strength of any wood along its grain is much greater than across the grain, equalization of strength properties is approximated by the increase of strength in one direction counterbalanced by a decrease in the other direction.

The greater the number of plies for a given thickness the more nearly equal will be the strength properties along and across the panel, and the greater the resistance to splitting. The use of an odd number of plies permits a balancing of stresses, whereas when an even number are used, each pair of plies at right angles tends to distort the other when changes in moisture content present an opportunity for warpage or cupping. In addition, the shrinkage of plywood constructed from five or more plies is less than that of three-ply material and more nearly equal in directions parallel and perpendicular to the grain.

There follow a few examples of relatively simple projects employing plywood to a maximum degree. In general, plywood material is not suitable for rabbeting, grooving or dadoing operations, with hand tools. With high-speed machine tools satisfactory jointing can be accomplished particularly where the depth of the cut completely severs one or more plies and stops before entering the next ply or crossband. Exposed edges can be bound as illustrated in Figure 2.10 or sanded smooth and camouflaged with darker stain than used on the face of the material. If preferred, the edges may be painted with a suitably light undercoat and brushgrained with the face stain.

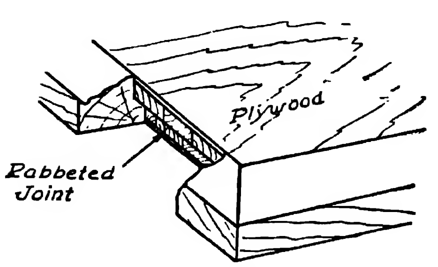


FIG. 2.10. Nosing glued on for shaping.

Beverage Tray. A straight, six-glass beverage tray is a satisfying project to assemble from scrap lumber.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	5	6	Ends
2	¼	5	24½	Shelves

The endpieces are filed and sanded round on one or both top edges, and ¼-in. dadoes cut horizontally across the inner faces, 2 in. apart and 1 in. up from the bottoms. One-inch dowels or other suitable handles are screwed in place from inside, as illustrated in Figure 2.11.

In the upper shelf six holes with 3-in. diameters are cut out 1 in. apart, starting 1½ in. from the ends. The two plywood shelves can now be glued into their grooves and the tray finished as desired. The diameters of the holes in the upper shelves should of course conform to the size of the glassware on hand.

Corner Lamp Table. Two pieces of plywood and a half dozen dowels when assembled as shown in Figure 2.12 will produce a modern corner lamp table of

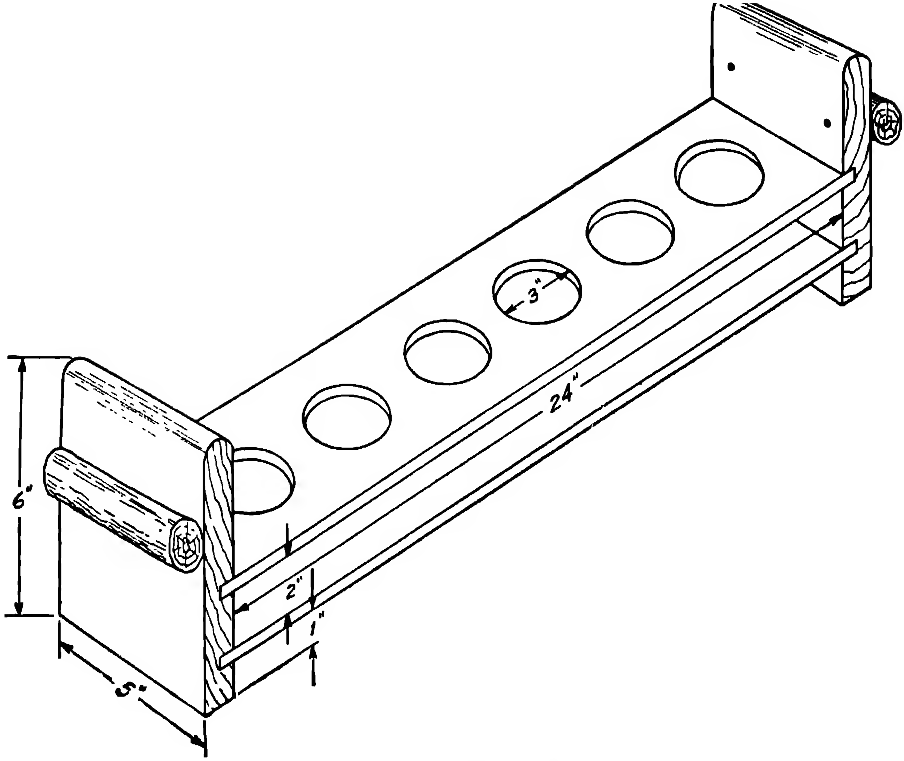


Fig. 2.11. Beverage tray.

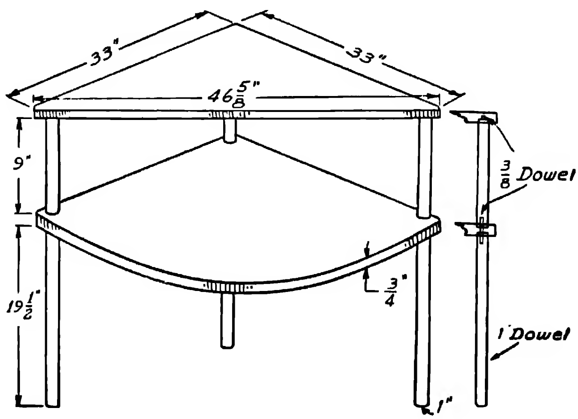


Fig. 2.12. Corner lamp table.

simple but effective design. Placed in a corner between two loveseats, or units of a sectional sofa, it not only serves as a lamp and smoking accessory stand, but also offers space for magazines and beverages.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	40	40	Top and shelf
3	1	—	9½	Top legs (dowels)
3	1	—	19¼	Bottom legs (dowels)
3	⅜	—	3¾	Dowels, through shelf
3	⅜	—	1½	Dowels, into top

Figure 2.12 illustrates the construction in detail. All edges are rounded and sanded.

In place of the wood top, plate glass with beveled edges and holes drilled above the top dowel legs would be in perfect tune with modern development. The glass can be attached to the tops of the legs by means of screws threaded through ornamental metal rosettes.

Hanging Bookcase. Somewhat reminiscent of Chippendale, the restrained curves of this Colonial bookcase (Figure 2.13) support two shelves that will hold at least twenty average-sized books, a top shelf for bric-a-brac, and a small drawer for oddments.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	½	8	35	Sides
1	½	5½	16	Top shelf
1	½	6	16	Middle shelf
1	½	7	16	Bottom shelf
1	3/16	16	19½	Plywood back
1	½	4	16	Top spreader
1	½	2½	15½	Drawer front
2	½	2½	6	Drawer sides
1	3/16	2 5/16	15	Drawer back
1	3/16	5¾	15	Drawer bottom
2	3/16	¾	5¾	Drawer runs

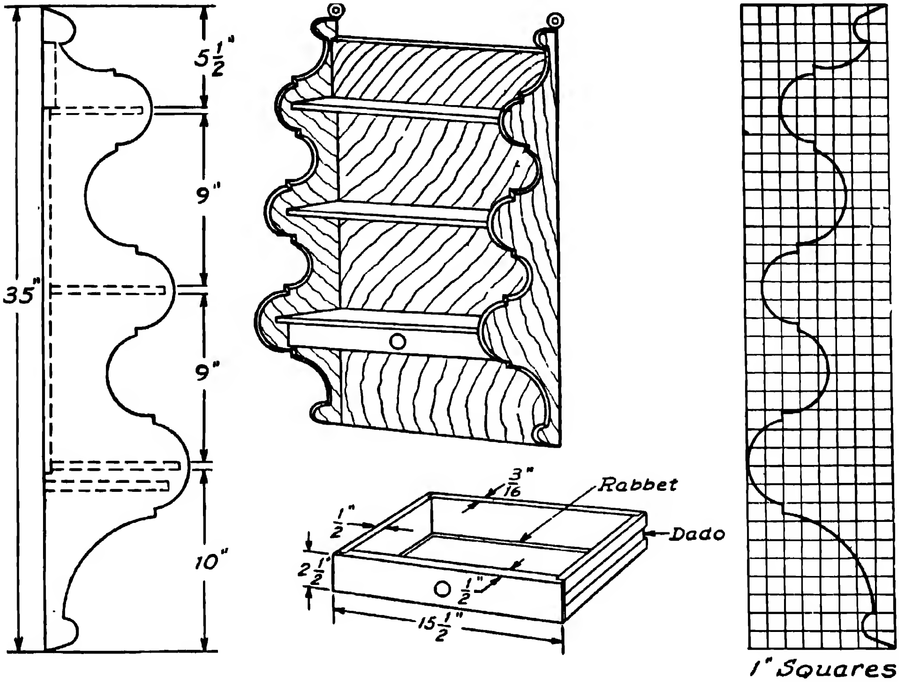


FIG. 2.13. Hanging book case.

This project can be cut from ½-in. plywood or from solid stock, as preferred, and solid stock can be used for a glued-up back also. After the design shown in Figure 2.13 is copied on 1-in. squares it is laid out on one of the sidepieces, and the two sidepieces are then clamped together or bradded outside the usable area. Both sides can then be cut out at one time with a coping saw or jig saw. The exposed edges of the sides, shelves, and spreader are finished smooth by sanding.

Rabbets $\frac{3}{16}$ in. deep and ¼ in. wide are cut in the inner rear edges of the sides to receive the plywood back, and in the bottoms of the drawer front and sides for the $\frac{3}{16}$-in. bottom panel.

Blind dadoes ¼ in. deep and ½ in. wide are cut in the sides of the bookcase the lengths of the respective shelves, measured at right angles to the back rabbet, with a ¼ in. × ½ in. blind rabbet for the spreader. Dadoes $\frac{3}{16}$ in. deep and ¾ in. wide are cut in the center of the drawer sides for the runners. After the drawer parts are sanded the runners should be tested in their grooves for smooth fit.

Three screw holes are drilled along the centers of each shelf dado and countersunk $\frac{3}{16}$ in. on the outside; two such holes are prepared for each end of the spreader. The bookcase can now be assembled with flathead screws and glue. When dry, the back panel is bradded in place along its rabbet and screwed to the

back edges of the shelves. Countersunk screwheads are covered by glued plugs cut from close fitting dowels and sanded flush.

The drawer sides are now assembled to the front and back with glue and brads and the bottom is slid into place and bradded. With the drawer as a templet the locations of the two runners can be marked for gluing and bradding into place.

A wooden or brass knob is screwed into the drawer front and the bookcase is ready for finishing. Many old Colonial pieces used black paint to cover end-grain edges. For sanded plywood edges a darker stain can be used or a close grain simulated over a light undercoat.

Since the sides are 15½ in. apart, the bookshelf can be hung on nails or screws driven into the studs of a wall, which are customarily spaced on 16 in. centers. Holes for this purpose can be drilled diagonally in the upper portion of the sides, or, for greater strength, flat metal eyelets purchased or cut from sheet metal and screwed into the back of the top ends. If it is not desired to drive nails into the walls, the bookshelves can be suspended from wires from picture hangers hooked over the picture molding.

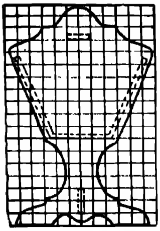
Sewing Cabinet. Of continuing popularity with the fair sex are various forms of Priscilla sewing cabinets (see Figure 2.14). The compact little receptacle described below can be cut from plywood and assembled with a few simple tools.

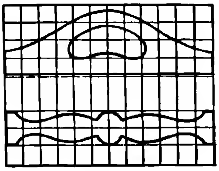
Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	⅜	12	18	Ends
2	⅜	7	12	Sides
1	⅜	5¾	12	Bottom
2	⅜	5	12	Lids
1	⅜	2	12	Rail
1	⅜	4	12	Handle
1	⅜	2	12	Bottom stretcher
1	¼	5	11¼	Tray bottom
2	¼	1¼	11¼	Tray sides
4	¼	1¼	4½	Tray ends and partitions
2	⅜	¾	10	Tray supports, cleats

First the design in A of Figure 2.14 is transferred to one of the end pieces, after which its is cut out of both ends, clamped or bradded together. The handle and bottom stretcher (detail B) are then cut out, and all edges sanded thoroughly.

Although so light an article can be butt-jointed, glued, and screwed, longer service will be insured if dadoes are cut in the end pieces to receive the stretcher,





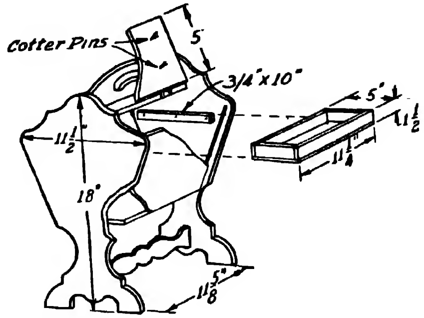
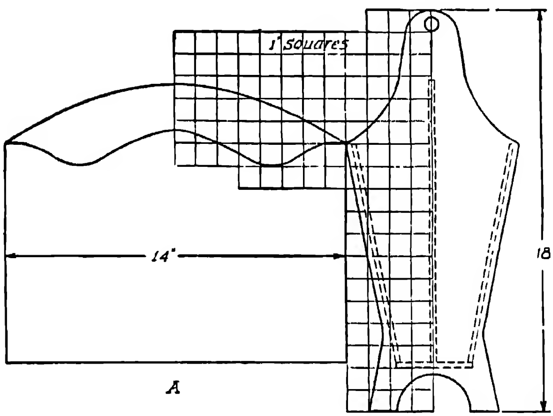


Fig. 2.14. Sewing cabinet.



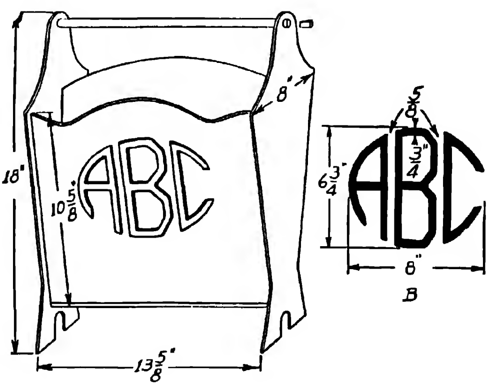


Fig. 2.15. Magazine rack.

bottom, sides, rail, and handle, all of which must be squared and cut to exactly equal lengths to insure true corners. After a "dry" fitting, the upper edges of the cleats are sanded smooth before they are screwed in place on the sides to support the tray, just under the eaves.

Glue is now applied to the stretcher, bottom, sides, rail and handle, which are then inserted in their dadoes in the sides in the order named, and screwed tightly in place. Roundheaded screws may be used and left exposed, or flatheaded ones can be countersunk and plugged.

After the glue has dried the lids are fitted and scored for ¾ in. brass hinges. Recesses are cut and the hinges screwed to the lid edges.

Before the lids are attached to the rail, spool holders are sunk into their inner sides. An effective type can be improvised from cotter pins whose heads have been hammered flat and sharpened. Driven into the under sides of the lids, their leaves can be spread apart to retain the spools when upside down.

The hinges can now be screwed into the rails and small brass sash knobs mounted on the lids.

Magazine Rack. Assembled in the same manner as the sewing cabinet, the magazine rack shown in Figure 2.15 will hold the longest weekly magazines and is easy to move about. The monogram is jig-sawed out of ¼-in. plywood and glued in place.

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	⅜	8	18	Ends
2	⅜	10¼	14	Sides
1	⅜	12½	14	Partition
1	⅜	4¼	14	Bottom
1	¾	—	14⅜	Handle (dowel)
1	¼	6¼	7½	Monogram

One half of the end panel is laid out in the 1-in. graph squares illustrated in A, Figure 2.15. The other half of the design is traced on the plywood by turning the pattern over. Both ends can be cut out at one time by bradding them together in the waste parts of the pattern. The same procedure is followed with the sides; the partition is a single job.

The ends are routed out as shown in the diagram and holes bored for the dowel-handle. These holes are enlarged on the outer edges to permit wedging the slit ends of the dowel from the outside.

To design the monogram a paper circle of 3⅜-in. radius is cut out as a pattern,

(see detail B). This, in turn, is cut vertically into three equal segments, which are laid on another sheet of paper so that they are separated equidistantly 5/8 in. Their outlines are penciled in as patterns, after which they are removed, and inner lines drawn 3/4 in. inside the penciled outlines. A sketch of the desired monogram is made by erasing the necessary arcs and adding cross members as required.

After the monogram has been cut and glued 2 in. down from the top center of the side, the bottom, sides and handle are assembled for a dry fit, then glued and clamped. Countersunk brads or screws may be added for strength; or round- or ovalheaded screws may be left exposed.

The ends of the dowel-handle are saw-kerfed 3/8 in. and short wedges are driven in for a tight fit.

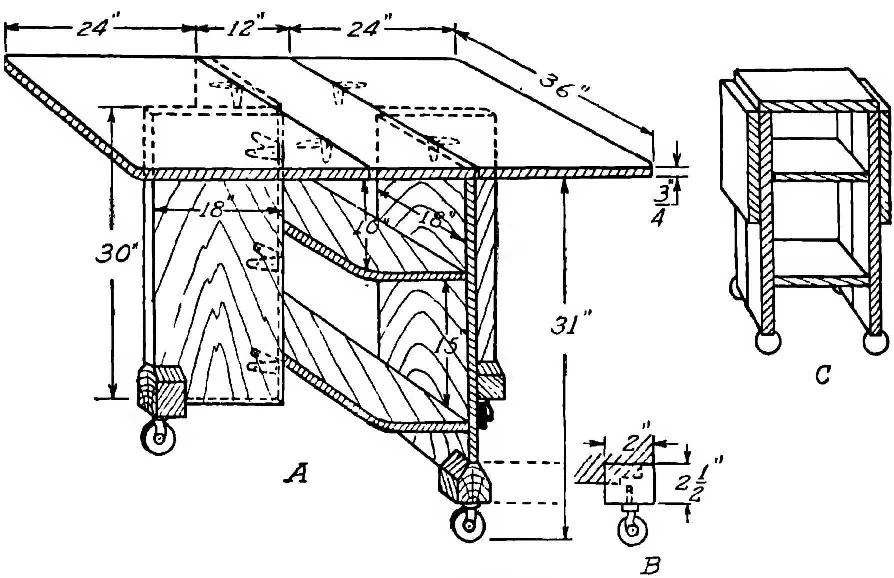


Fig. 2.16. Gateleg dinette.

Gateleg Dinette. A handy kitchen accessory is a gateleg dinette (Figure 2.16). When completely closed it presents a serving or work surface 1 ft. wide and 3 ft. long, but when both leaves are open it will seat six to eight average persons. Constructed from a 4 ft. × 9 ft. sheet of 3/4 in. plywood, a few pieces of scrap, and ten butt hinges, it includes two shelves, which offer convenient storage space and add rigidity to the frame.

The construction of the table is diagramatically explained in A of Figure 2.16. Butt joints are shown, which are strengthened by the use of angle irons under the table top and the shelves, to withstand hard service. An alternate method would be to rabbet the sides to the table top and support the shelves in blind dadoes. This would shorten both leaves and sides by 1/2 in.

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	¾	12	36	Top
2	¾	24	36	Leaves
2	¾	18	30	Sides
2	¾	18	30	Gates
2	¾	10½	36	Shelves
4	2	2	2½	Blocks, casters

By cutting out the outer corner of the gates as shown in detail B the caster blocks can be mitered into place without visible joint. When facilities exist, four croquet balls can be mitered for use as feet (see sketch C). All screws are countersunk and puttied for an enamel or lacquer finish.

BOOKCASES

Built-in Bookcases. Well-filled, built-in bookcases lining one or more walls of a room are among the most friendly aids to homelike decorating available. This is especially true where the books appear to have been selected for reading, rather than as formal decoration sets, with uncut leaves.

If the bookcase is built from wall to wall, or on either side of a projecting fireplace, construction can be simplified, inasmuch as only the base and the edges of the top, sides and shelves will be visible, as is seen in Figure 2.17.

A depth of 10 in. is adequate for the average large-sized book, and a spacing of 10 in. between shelves is sufficient for height. To vary the monotony and provide for different sized books, the upper shelf can be spaced at 9 in. and the bottom shelf at 14 in. A 3-in. base can be attached in several ways.

1. The base can be finished nailed to the edges of the sides, and quarter-round or cove molding nailed to its upper edge.

2. The base is recessed into the sides until its surface is flush with the edge of the lower shelf.

3. By deepening the recess an additional 1 in. to 1½ in., a modern set-back base results.

4. The base can be doweled or angle-ironed between the sides so that it is flush with them and the lower shelf.

While dadoes, or grooves in the sides, preferably stopped, will provide the better support, in this case, where the sidepieces will hug a wall or projection, a nailing job will suffice

Before cutting and marking the sides, however, it must be determined whether the floor is level and the walls are plumb. To proceed otherwise may result in a catastrophic inability to force the assembled case into a space that proves to be narrower at the top or bottom, or sinks at one corner so that the shelving is on a slant. In either event the bookcase must be dismantled and rebuilt to fit.

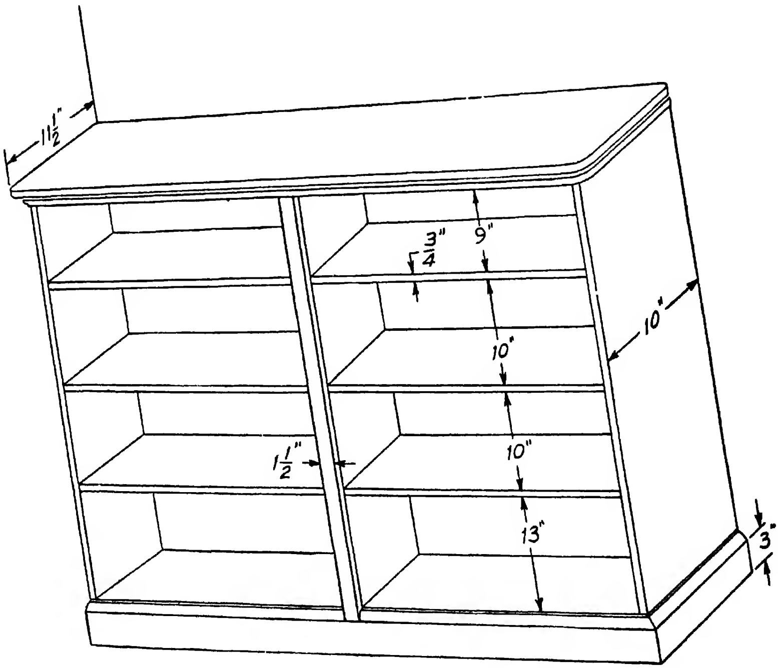


FIG. 2.17. Built-in book case.

Unless thick shelving is used, a bookcase that must exceed 4 ft. will require center bracing. Pieces of 10 in. × 10 in. shelving will do, but a better effect will result if they are narrowed sufficiently to permit the insertion of 1½ in. vertical strips flush with the top edge of the base. These strips should run from the top to the base in one piece, as illustrated in Figure 2.17. The bookcase shown in the illustration has one end exposed and makes use of a cove molding along the upper edge of the base and the lower edge of the top.

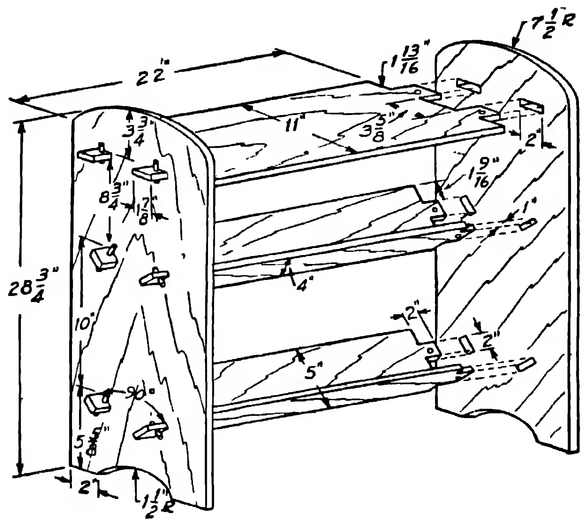


FIG. 2.18 Trough bookshelves.

Trough Bookshelves. Utilizing no nails, screws, bolts or glue, the combination end table and book troughs illustrated in Figure 2.18 can be quickly disassembled by removing the dowel wedges from the tenons.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	11	28¾	Sides
1	¾	11	26	Top
2	¾	5	26	Trough fronts
2	¾	4	26	Trough backs
6	½	—	2¾	Dowels

Using the ends of the trough fronts and backs as straightedges, it is a good plan first to draw on one of the sides, lines that will serve as a layout for the troughs' positions, to insure proper alignment. The front troughs can then be clamped together and the 1⅞ in. × 2 in. tenons cut out, 1 in. in from each edge at both ends, as shown in the drawing. The same procedure is followed with the back troughs, the tenons being centered 1⁹⁄₁₆ in. from each edge. The double tenons of the top shelf can now be cut out 3⅝ in. apart, 1¹³⁄₁₆ in. in from each edge. All tenons are 1⅞ in. wide and 2 in. long.

Next the ends are clamped together and the curves at tops and bottoms cut out simultaneously in both. Without removing the clamps the 2-in. mortises for the top are laid out, checked against the actual tenons, and bored out with a ¾-in. bit. The same procedure is followed with the fronts and backs of the troughs.

When all holes are bored, the clamps are removed and the mortises chiseled out or cleared with a coping saw. If the work is done carefully the fit should be "easy," because all tenons are ⅛ in. narrower than their mortises.

The bookcase should be assembled before markings are made for the ½-in. dowel holes, which should be close against the outer faces of the sides. The holes should be cut with the near sides a trifle farther in than the marks indicate, to allow for drawing up tightly. Each dowel is sanded slightly on one side.

In place of dowels, wedges can be sawed out in pairs and chamfered on the outer horizontal edges. For further refinement a ¼-in. triangle can be cut off each corner of the tenons. By doubling the width and height, a knockdown bookcase with four shelves can be constructed with a minimum of hand tools.

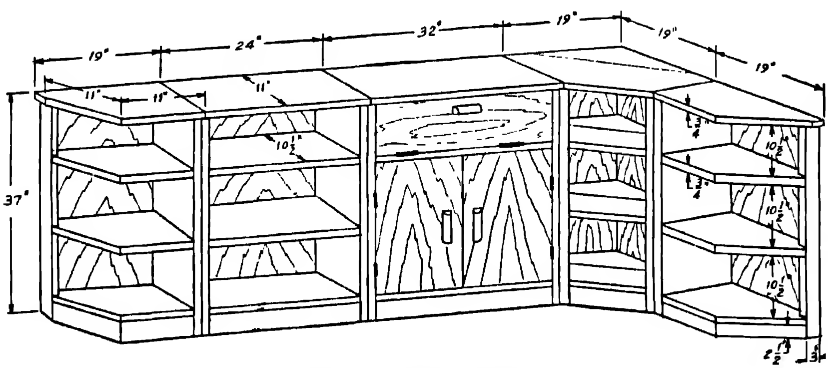


Fig. 2 19. Unit bookcases.

Unit Bookcases. The present trend in modern furniture design is the development of self-sufficient units that are susceptible to the addition of other units without diminution of utility or detraction from the original theme.

The bookcase units described below (see Figure 2.19) are of a simple design, which can be varied at will. Scrolled members can be substituted for the straight bases, a narrow front apron added, the uprights and shelves beaded or molded, and drawers or drop fronts added as required. While the length of the units can be varied to suit the available space, it will be found that their over-all height and depth will prove satisfactory in most rooms. The shelves will accommodate average books, but can easily be made adjustable by boring equally spaced holes inside both sides, and resting the shelves on pegs or metal plugs.

The construction of the 24-in. section is obvious. For a paint job finishing nails can be driven through the top and sides into butt joints, then countersunk and puttied, the plywood back being relied on for strengthening. Otherwise, blind

dowels or screws that have been countersunk and plugged can be used. The better practice would be to use blind dadoes for the shelving. The 1/8-in. plywood back is bradded to the shelves 1/4 in. back from the outer edges of the top and sides, for concealment. The top has an overhang of 1/2 in. in the front.

Lumber List

End Case

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
1	3/4	11	19	Top
1	3/4	10 1/2	36 1/4	Side
1	3/4	3	36 1/4	End
3	3/4	10 1/2	17	Shelves
1	1/8	18	34	Back (plywood)
2	3/4	2 1/2	11	Base

24-in. Case

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
1	3/4	11	24	Top
2	3/4	10 1/2	36 1/4	Sides
3	3/4	10 1/2	22 1/2	Shelves
1	1/8	23 1/2	34	Back (plywood)
1	3/4	2 1/2	22 1/2	Base

Corner Case

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
2	3/4	10 1/2	19	Top
2	3/4	11 3/4	36 1/4	Sides, front
3	3/4	3	36 1/4	Sides, rear
6	3/4	10 1/4	24 1/4	Shelves
2	1/8	18 1/2	34	Back (plywood)
1	3/4	2 1/2	10 1/2	Base

Desk Case

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	¾	11	32	Top
2	¾	10½	36¼	Sides
3	¾	10½	30½	Desk shelf
1	¾	10½	30½	Desk leaf
2	¾	9¾	30½	Shelves
2	¾	15¼	30½	Doors (plywood)
1	⅛	31½	34	Back (plywood)
1	¾	2½	30½	Base
2	½	¾	30½	Stopping strips

The end case is constructed in like manner with the shelves mitered and cut out to fit flush with the outer edge of the narrow, strip side. The shelves are cut 11 in. long on each side of the front angle. The outside corner of the base is mitered and braced by the shelving nailed from above. If preferred, a quarter circle can be cut in place of the angle. This will necessitate either a band-sawed base panel, or a built-up, solid piece.

The desk unit is of the same basic construction as the 24-in. unit with a hinged front panel between the top and the first shelf. Two ¾-in. plywood doors mask the remaining shelves.

The upper edge of the drop-leaf desk panel must be tapered or beveled rearward to prevent binding. A stopping strip is nailed or screwed to the underside of the top to keep the desk front flush with the sides. Lid stays are added for support, and a suitable handle and bullet catch are attached to the top of the desk leaf, unless a lock is required.

A stopping strip for the doors is attached to the underside of the desk shelf, and the next shelf recessed the amount of the doors' thickness, in this case ¾ in. Butt hinges, knobs, and friction catches complete the unit.

REEDED FURNITURE

Reeding usually refers to the machine-carving of wood into narrow convex serrations which are parallel longitudinally. Large reeded surfaces can be quickly constructed with hand tools, however, by using lengths of half-round molding available at most lumberyards. Fastened to circular forms and painted, the resulting reeded effect is interestingly modern.

Table Lamp. One of the simplest reeded articles to make is a table lamp.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	¾	6½	6½	Base
1	¾	5¾	5¾	Top
2	¾	5	5	Spreaders
29	¼	½	9	Half-round molding

Two disks are cut with 5-in. diameters and mounted 7½ in. apart on a ½-in. dowel. A piece of heavy paper or flexible semicardboard, such as a telephone book or catalogue cover, is lightly tacked and glued flush with the edges of the disks to form a cylinder. The tacks are removed after the glue has dried.

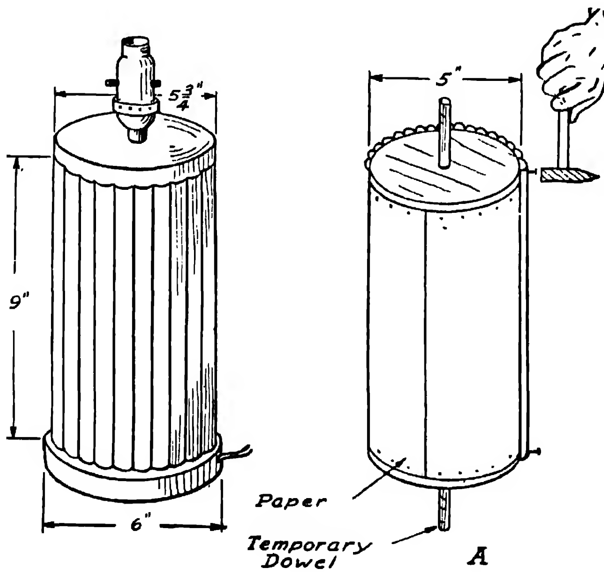


FIG. 2.20. Reeded table lamp.

Over 30 ft. of ½-in. half-round molding is cut into twenty-nine 9-in. lengths, which are then glued to the paper cylinder and bradded at each end, as in A of Figure 2.20. When but seven or eight pieces of molding remain to be attached, it is well to check their spacing. If too tight a fit is indicated, the edges of one or more pieces can be filed or sanded down; if the reverse is true, a loose spacing between the remaining pieces will be concealed by the paper backing when paint is applied. No molding ends should protrude beyond the outer faces of the disks.

The base disk has a 6½-in. diameter with a ½-in. hole in its center from which a channel is routed out to the edge to receive the lamp cord. The base is fastened to one end of the reeded lamp assembly by three screws driven from the underside, so that the base overlaps the spreader disk ¾ in.

A top disk with a 5¾-in. diameter is cut to fit snugly over and conceal the top ends of the moldings. A ⅛-in. nipple is fitted into the center of the disk, and then the latter can be glued to the upper spreader disk.

Wire is threaded through the nipple and the double base, then into its groove out the side of the bottom base piece. A standard socket is screwed into the nipple and wired, and a suitable plug is attached to the free end of the wire. A piece of felt can be glued to the bottom of the base to cover the wire's channel and to prevent marring any surface upon which it stands.

Bench. A reeded bench (Figure 2.21) will complement a dressing table covered with organdy, chintz, mirrors, or paint. Its construction is as simple as that of the lamp just described.

The two pieces for the top are doweled and glued together and when dry, compass- or band-sawed into the pattern shown in A, 2.21, with ends rounded on 6½-in. radii.

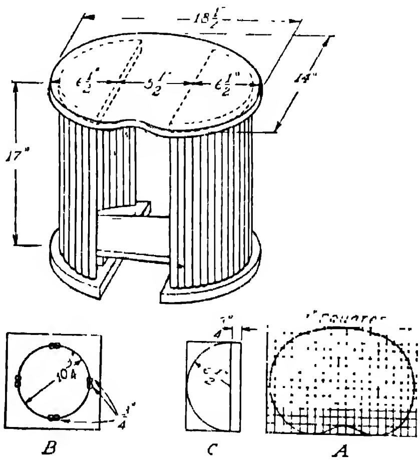


Fig. 2-21. Reeded bench.

A circle with a 10¾-in. diameter is marked off on one of the 12¾-in. blocks, which is then marked into quarters. The two blocks are clamped together face to face, or nailed through the waste, and eight ¾-in. holes bored as shown in B, bisecting the circumference of the circle in pairs, tangent to each other and to the quartering lines. Both blocks can then be sawed into disks at the same time, then halved.

On one of the feet a semicircle, ¾ in. in from one straight edge, is marked off with a 6½-in. radius. Both feet are cut to this pattern (C), and one of the semicircular blocks is laid on one of the feet so that its diameter is ¾ in. in from the diameter of the foot, and its circumference is 1⅛ in. inside that of the foot. The centers of the four half holes in the block are carefully located and marked on the foot. Four ¾-in. holes are bored in each foot ⅜ in. deep at these points to receive the ends of four ¾-in. dowels, 16¼ in. long.

Similar holes are bored in the top with the aid of a block as templet, and the dowels, tops, feet, and blocks assembled "dry" for fit.

Thirty-two pieces of ¾-in. half-round molding are now cut exactly 15½ in. long. A pair of blocks are propped up or clamped on their flat edges 14 in. apart

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	3/4	7	18 1/2	Top (14 in. wide)
2	3/4	7 1/2	14	Feet
2	3/4	12 3/4	12 3/4	Blocks
1	3/4	4	15 1/4	Spreader
32	3/8	3/4	15 1/2	Half-round moldings (legs)
8	3/4	—	16 1/4	Dowels (legs)

and a 3/4-in. dowel laid in one of the two pairs of bottom half holes. Moldin strips are then finish-nailed at each end to the circumferences of the blocks until the upper half holes are reached. These are filled by laying dowels in them and the remaining segment of the blocks is nailed up with moldings. The same procedure is followed with the other pair of blocks, to form the second leg of the bench.

Dressing Table. The basic simplicity in the construction of the reeded bench lends itself to the design of a dressing table (Figure 2.22), whose graceful, reeded front compartment needs no ruffled fabrics for concealment or decorative effect.

The plywood top is cut according to the pattern shown in A, of Figure 2.22. In order to decrease the depth of the curved portions, the radius of 7 in. is 7/8 in. less than the half circle.

Along the inside of the vertical rear edges of the two outer sides a 1/4-in. groove is routed 1/2 in. deep to receive the 1/4-in. plywood back.

With the table top upside down on the workbench or the floor, the outer sides and their plywood back panel are attached to the underside of the top, flush with its back edge, by means of angle irons, mortise fasteners, or pocket screwing. The top should overhang the sides by 5/8 in. The inner sides are then fastened to the top 11 1/4 in. from the outer sides. The plywood back is screwed to the rear edges of the inner sides from the back and front apron is attached 5/8 in. back from the front edge and screwed to the inner sides. The table can then be righted.

The two curved bases for the doors are each cut from two pieces of 1 1/2-in. stock, which are screwed together from the underside, in pairs. Doweled to their corners are the two pieces of 1 1/2-in. baseboard that are attached to the outer sides, inner sides, and the back, with screws from the inside and the rear. Cleats are screwed inside the sidepieces of the table 1/2 in. below the level of the curved bases so that the 1/2-in. plywood bottoms will lay flush with the upper faces of the bases.

The tops and bottoms of the doors, as well as the two 1/4-in. plywood door shelves, are cut on a 6-in. radius set back 7/8 in. from the diameter of the full half circles. Mortises are cut in the centers and outer corners of these half disks to

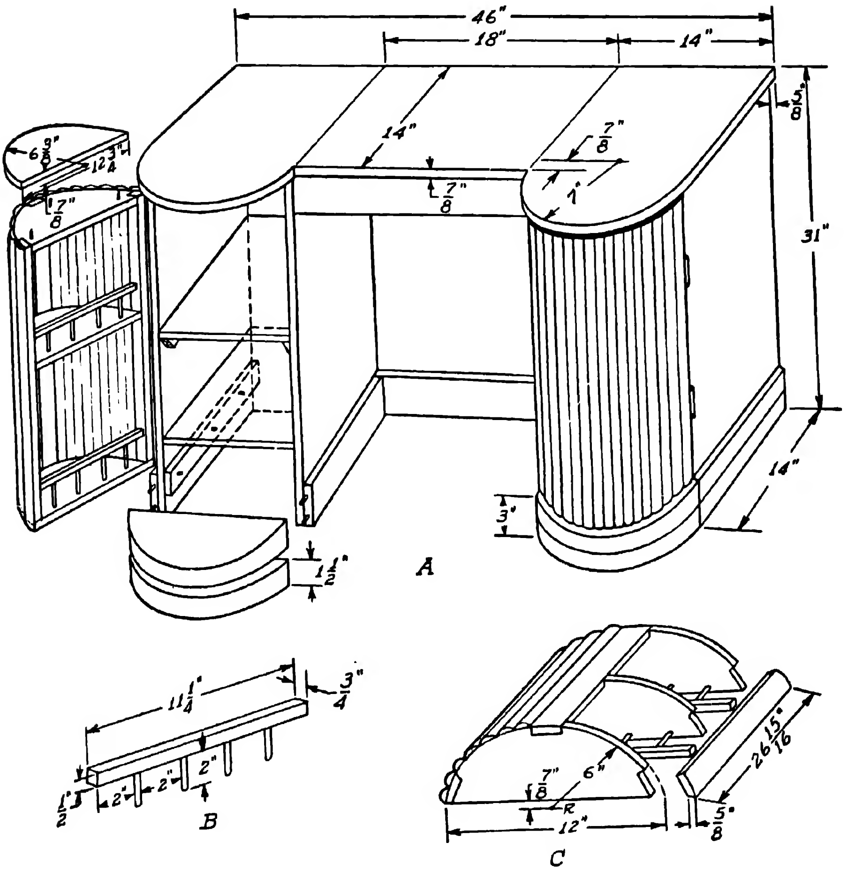


FIG. 2.22. Reeded dressing table.

receive the uprights, whose outer corners are sanded to conform to the circumferences. The face edges of the two outer uprights must be beveled slightly to continue the straight lines of the diameters of the tops and bottoms. A ¼-in. groove is cut midway up each upright to hold the shelves in place. The mortises in the shelves should not be cut until they are first filled into the grooves in the uprights to determine the exact depth necessary.

The railings in front of each of the doors' shelves and bottoms consists of a ½ in. × ¾ in. strip into which four (or more) dowels 2 in. long are sunk at 2-in. intervals, as in detail B. Mortises are cut at the proper height in the side uprights after holes have been bored for the dowel ends in the front edges of the shelves and door bottoms.

The center upright of a door is screwed in place in its mortises, with its ends

flush with the upper and lower surfaces of the tops and bottoms, now 25⅞₁₆ in. apart. The shelf is now slid into place and the dowels of the railing inserted into their holes before the end of the railing is fitted into its mortise in an end upright, which is in turn fitted into its mortises in the half disks and screwed into place, as shown in detail C. The remaining upright is fastened, and the door framework trued up for square corners.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	¾	21	46	Top (plywood)
2	¾	14	30¼	Outer sides
2	¾	13¼	30¼	Inner sides
1	¼	30¼	43¼	Back (plywood)
1	¾	3	20	Front apron
4	¾	1½	14	Baseboard, outer sides
4	¾	1½	12½	Baseboard, inner sides
2	¾	1½	20	Baseboard, back
4	1½	14	6½	Bases, curved
2	½	11½	12½	Bottoms (plywood)
4	¾	1	12½	Cleats, bottoms
2–4	¾	11¼	12½	Shelves
4–8	¾	1	12½	Cleats, shelves
4	¾	6½	12	Tops and bottoms, doors
6	⅝	1¼	26¹⁵⁄₁₆	Uprights, door
44	⅜	¾	26¹⁵⁄₁₆	Half-round moldings
2	¼	6⅛	12	Shelves (plywood), doors
2	¼	6½	12¾	Top covers, doors
4	½	¾	11¼	Railings, door shelves
20–24	¼	¼	2¼	Dowels, door shelves

Twenty-two half-round moldings are cut 26¹⁵⁄₁₆ in. long for each door and fastened in place with wire finishing nails at tops and bottoms. It is good practice first to fit the moldings in place without nailing, in order to determine which pieces it may be necessary to sand or bevel down for the final fit.

After sanding all molding ends to insure that they are flush with their tops and smooth on their bottom surfaces, covering caps of ¼-in. plywood are cut on a 6⅜-in. radius and screwed to the tops from underneath, to cover the ends of the moldings.

Gains are now cut for two hinges on each door, and friction catches mounted

to the edges of the tops, after the hinges have been screwed on. Fingertip bevels can be gouged out near the upper edges of the inner sides to obviate handles or doorknobs.

Shelves can be cleated or pegged to any convenient height within the two compartments. If shoes or slippers are to be stored in either compartment, the shelf may be inclined at 30°–40° with a cleat across its upper rear top surface to engage the shoes' heels. If preferred, drawers may be installed, or the front apron can be built into a drawer front, resting on a drawer rail.

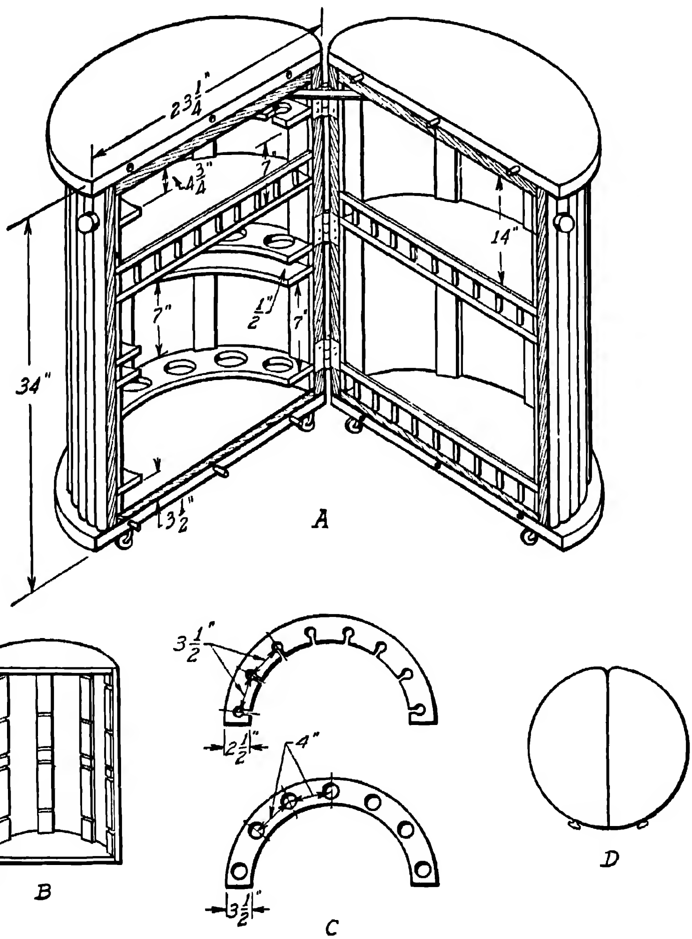


FIG. 2.23. Reeded cellarette.

Cellarette. During its off-duty hours the cellarette pictured in Figure 2.23 closes to form a pedestal table that will harmonize with nearly all types of furniture.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	7/8	12	24	Top
4	3/4	6	23	Upper spreader
2	7/8	12	24	Bottom
4	3/4	6	23	Lower spreader
10	3/4	1 1/2	32 1/4	Uprights
66	1/2	1	32 1/4	Half-round moldings
1	1/4	24	48	Shelves (plywood)
3	1/2	3/4	19 1/2	Railings
30	1/4		2 1/2	Dowels (railings)

The cellarette consists of two identical hinged halves whose construction is typical of the reeded piece previously described. Discarded extension leaves from an old dining table make ideal tops and bottoms after they are cut on a 11 5/8-in. radius; otherwise narrower widths will have to be glued up. The upper and lower spreaders are glued up from narrower 3/4-in. stock and cut into half discs on a 10-in. radius.

The halves of the cellarette are assembled in the same manner as were the doors of the dressing table previously described. Mortises are cut in the spreaders to receive the uprights flush with the circumferences as shown in detail B, Figure 2.23. Five grooves are routed in each upright of the left-hand section of the cellarette, to receive five pieces of curved 1/4-in. plywood for racks and shelves. The uprights of the right-hand section are grooved but once, halfway up.

The plywood shelves and racks are cut to the same diameter as the spreaders. When they are fitted into their grooves in the uprights they can be marked for the amount of mortise necessary to sink the uprights flush with the outer circumferences of the shelves. Suggested measurements for the racks are included in detail C, but must be varied to suit the size and type of glassware used.

The center upright can now be screwed into its mortises in the top and bottom spreader half disks, followed by the uprights to the right and left of center. The shelves, racks, and railings are then inserted and the two outer uprights fastened into place, flush with the right and left corners. While the framework remains face down upon the workbench the moldings can be nailed in place with three finishing nails, countersunk, and puttied.

After both sections have been reeded, they are stood upon their bottoms so that there is a 1 1/8-in. lap all around the circumference, with the diameters flush. It will be noticed that the outer corners of this lap on the hinge side must be beveled off curved, as shown in the plan D, to permit the sides to open without

bursting the hinges. When this is accomplished so that no spreading of the inner face uprights is observed when the sides of the cellarette are swung open, the bottoms are used as templets for cutting the rear corners of the tops. Holes are drilled on the underside of the bottoms for three casters each, two under the corners near the straight sides and the third one opposite, at the apex of an equilateral triangle.

The hinges can now be mortised in to join the inner uprights of the two sections. After positions of the tops and bottoms have been marked, the hinges are fastened to their spreaders with screws, from the inside faces.

The doweled railings shown in the right-hand section in A, Figure 2.23, are screwed into their mortises. Two brass knobs are screwed into place for opening and closing the cellarette sections.

If the cellarette is to be moved about much when closed, the hinges are apt to be subjected to undue strain when the casters are pushed over rugs, threshold, linoleum edges, and other inequalities. It will be excellent practice, therefore, to equip the top and bottom with short chamfered dowels on one side that will fit into holes in the opposite edge, similar to the method of securing extra leaves in an extension table.

Tables

Always held in high esteem since earliest times, tables are now assuming additional importance by virtue of the dual roles often imposed upon them in this era of small homes and apartments. Their use has been further augmented by the application of common sense to modern decorating methods, stressing the central theme of comfort for the room's occupants. Thus we now have a profusion of side and end tables from which to select the proper lamp stand, or the most effective book, magazine, smoking accessory or beverage holder to fit the given height of a favorite armchair, loveseat or davenport. Larger forms include gateleg, drop-leaf and extension features that permit the decorative side table to double as a dining or gaming unit. The vogue for Colonial New England or Pennsylvania Dutch pieces has resurrected such interesting "folklore furniture" as the Lazy Susan, hutch, harvest, sawbuck and trestle tables, augmented by milk benches, cobblers' benches, and a galaxy of straight, spool-turned, or richly carved gateleg tables with round, oval, triangular, octagonal, and other whimsically shaped but generally symmetrical tops. No matter what the form or finish, however, the construction of a satisfactory table depends upon the two basic elements of sturdiness and utility.

Table nomenclature in most respects parallels that of chairs. The underframing that connects the legs and helps support the table top is customarily formed from two to four pieces of lumber tenoned or doweled edgewise into the tops of the legs and referred to as "aprons." When these parts consist of narrower pieces set flat side up against the top, they are known as "rails."

If the aprons are not too wide they can be attached to the underside of the

top by means of screws turned through their edges and countersunk. A common practice, to avoid the use of such necessarily long screws, is that of pocket-screwing, as pictured in A of Figure 2.24. Angle irons can be profitably resorted to where

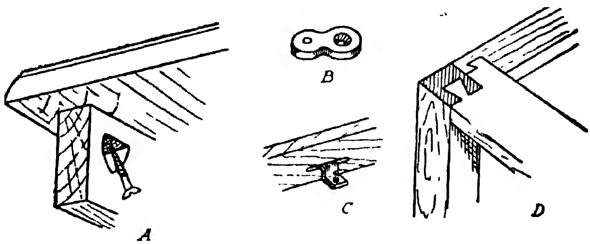


FIG. 2.24. Table top fasteners: *A*, Pocket screwing. *B*, Mortise fastener. *C*, Sliding lug. *D*, Rail dovetailed into post and rail.

complete concealment is assured, or mortise fasteners (shown in B) can be mortised into the tops of the table legs or aprons and screwed. The top of the mortise is left extending outward to provide a housing for short screws into the table top, thus permitting a swiveling action during shrinkage. The lug pictured in C is likewise allowed to slide in its slot if the top shrinks.

The usual practice in good cabinetmaking is to connect rails to legs by means of lapped dovetails as shown in detail D. Narrow rails of this type are common in commodes, bureaus, chiffoniers, and desks, whose tops can be secured by means of medium-sized screws through the rails.

Legs. In addition to square legs there are, in general, four divergent forms in common use, the tapered leg, the rounded leg, the turned leg, and the cabriole leg.

Tapered legs may have two sides slanted, or all four. The symmetry of a tapered leg depends upon an accurate layout on the original squared stock. The amount of taper having been determined, the horizontal distance is marked at the foot of both edges of one side of the leg. With a straightedge these marks are connected with their corresponding upper (thick) corners. The same is done on the opposite side to insure uniformity as the taper is planed, or band-sawed and planed down to the lines on both sides of the leg. Such a leg is set in a piece of furniture with the tapered sides inward, to suggest a splayed effect from the front. A continuation of the marking and cutting processes on the other side will produce a graceful leg tapering on all four sides.

Rounded legs can be produced with hand tools by beveling the edges of square legs into octagonal cross sections and planing, spokeshaving, filing, and sanding the edges until cylinders result.

Turned legs are produced on a lathe in designs varying from the very simple to richly ornate.

Cabriole legs at first glance appear difficult of manufacture. They are not hard to produce, however, provided it is always remembered that a single pattern or templet is to be used for both sides. Hence the original stock must be wide enough to accommodate the maximum curve of the templet in both directions, see Figure 2.25.

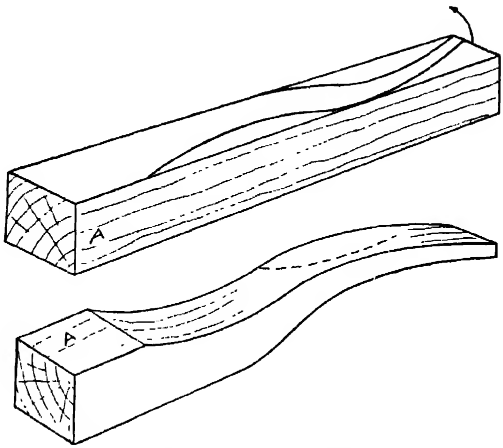


FIG. 2.25. Cabriole leg.

After the pattern is laid out on one side, the stock is band-sawed or cut out with a compass saw, then spokeshaved, filed, and sanded smooth. The same process is repeated on the other side and the resulting cabriole leg is smoothed down to a gracefully finished product.

Reeding. Reeding is a carving process frequently applied to turned legs resulting in a series of equal, convex, longitudinal divisions, or "reeds." In order to insure uniformity, a strip of paper whose length is equal to the circumference of the turned leg is marked into equal divisions of the desired width of the reeds. When the strip is wrapped around the turning, the marks can easily be transferred to the circumference of the piece.

For working, a bottomless reeding box (Figure 2.26) is constructed a fraction longer than the turning. The latter is fastened in place by a screw in the center of each end near the upper edges of the box. A wedge is placed at the side to steady the piece.

A marking gage is now adjusted to bear against the side of the box so that each reed can be marked off vertically the length of the turning. In hand reeding, each scratch mark must be V-cut with a veining tool, then rounded with a skew chisel to form the convex shapings between cuts.

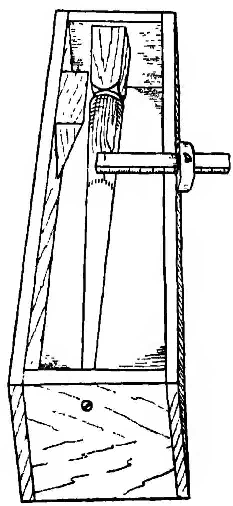


FIG. 2.26. Reeding box.

Fluting. The reverse of reeding is fluting, with concave flutes scooped out. A router plane with a round-nosed cutter is excellent for fluting.

Both reeding and fluting can be more easily accomplished with a routing machine, which will insure uniformity.

Stem legs. Unless draw bore pins are used on a mortise and tenon joint, as in A of Figure 2.27 or a sliding dovetail joint is cut as in B, the curved legs of a stem-leg assembly must be glued and clamped separately.

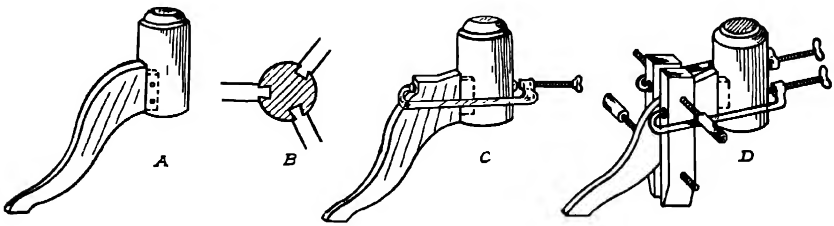


FIG. 2 27. Stem-leg joinery.

With either the plain mortise and tenon or the doweled joint, clamping will be simplified if a small shoulder is left, cut parallel to the tenon, as shown in C. If this shoulder is absent, a gripping surface for the C clamp can be provided by use of a hand screw, as in D.

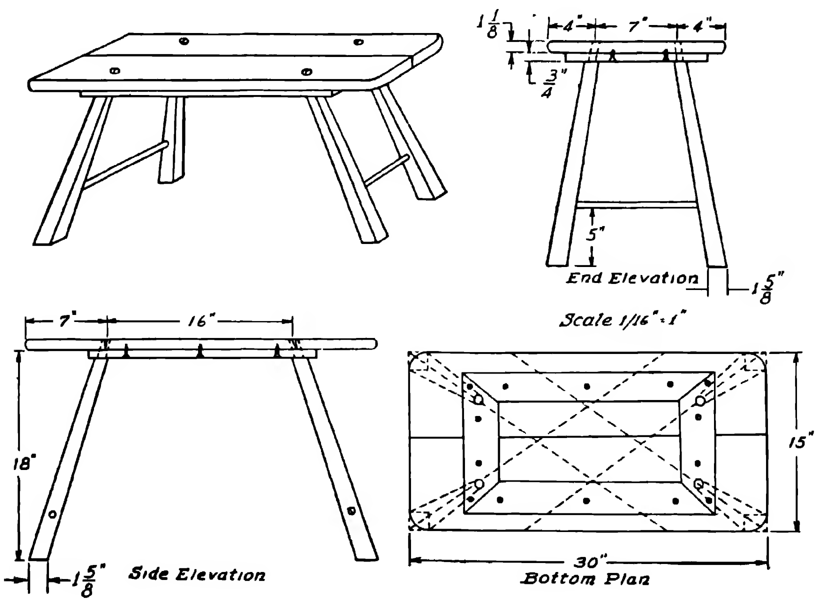


FIG. 2.28. Early American coffee table.

An Early American Coffee Table. The pleasing effect of this simplest of designs (Figure 2.28) depends upon the balanced symmetry of its splayed legs. Originally constructed with a single slab top, it will be found safer in these days of steamheated homes, to glue up two pieces to prevent future warping and splitting. Short dowels inserted between the edges will give added strength.

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	1	15	30	Top (15 in. wide)
4	1⅝	1⅝	20	Legs
2	¾	3	12	Cleats
2	¾	2½	21½	Rails
2	½	—	11	Stretchers (dowels)

The corners of the top are rounded off before the upper and lower edges are chamfered by planing. If the bevels are smooth and parallel, the edge will require but a light sanding "as is"; additional planing and heavy sanding will produce the familiar rounded edge.

The legs are planed down as shown in Figure 2.28, with the upper ends whittled or spakeshaved, then sanded into round tenons ¾ in. in diameter and 2 in. long. If preferred, the edges of all legs may be slightly chamfered.

To insure against warping or splitting, flat cleats are mitered as shown and screwed to the underside of the table, between and beyond the leg holes. The side rails may be very narrow, since they are only included for appearances.

Furniture legs may be tilted in one way only or in both ways to form a compound angle, as in the coffee table under construction. When the tilt is not shown in degrees, the T bevel can be set from a drawing of the project, which usually shows the amount of tilt in inches, or provides a bottom plan or side elevations from which the amount of tilt can be computed. By referring to the side and end elevations of the coffee table, it will be noted that the legs tilt 7 in. to the sides and 4 in. from the ends. A protractor could be applied directly to such a drawing, or if not available, one corner of the bottom can be drawn on a piece of wrapping paper, as shown in A of Figure 2.29. The drill hole, point *A*, is located with reference to the sides of the corner, and through it is drawn the center line of the leg. Point *B* is equal in length to the amount of tilt from the vertical as measured on the elevation, in this case 7 in. At *B*, a line equal to the height of the project (18 in.) is erected perpendicular to *AB*. Points *B* and *C* are connected, forming the angle *C*, which is the angle of tilt. The T bevel can be set directly to this angle (or the drill press table), as in detail B.

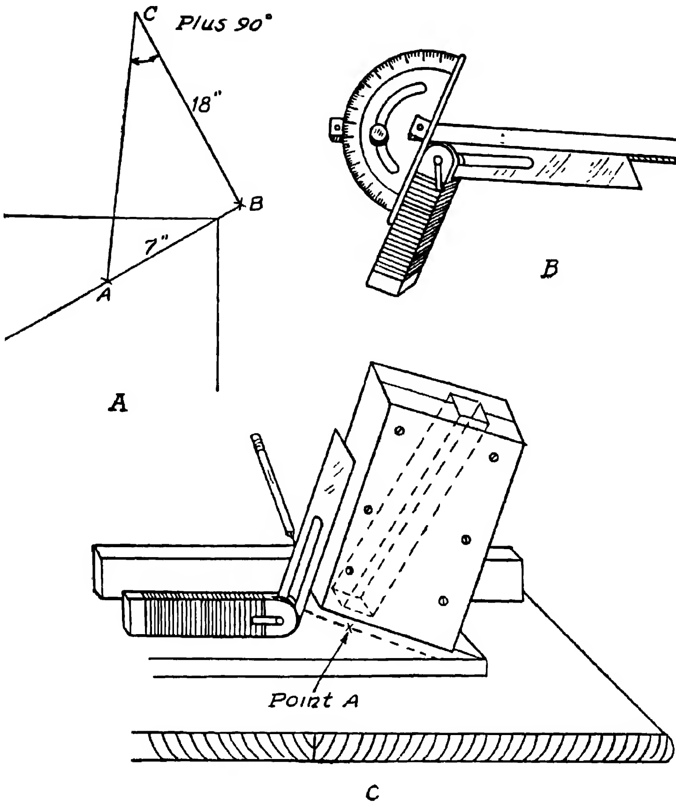


FIG. 2 29. Insuring equal taper of legs

To insure the hand boring of identical combination angles at each corner a simple jig can be constructed. In two pieces of ¾-in. scrap about 2 in. wide. dadoes ⅜ in. deep and ¾ in. wide are cut at 108° from the vertical, as shown in detail C. Screwed together these blocks will form a jig with a ¾-in. channel at a 108° angle. In order to also secure a 98° inclination at right angles for the side splaying of the legs, the jig must now be tilted sideways until parallel to the 98° reading on the miter gage. With a piece of ¾-in. scrap as a straightedge along the front (tilted) edge of the jig, a pencil line is drawn along the front and repeated at the back (detail C). When these two lines are joined by pencil marks along the sides, the lower part can be sawed off to form a finished jig which tilts at 108° in one direction, and 98° in the outer direction at right angles to it. Placed over point *A* on the centerline on the bottom of the table, the jig will guide a ¾-in bit when properly placed, at each successive intersection. Care must be taken to stop boring when the spur bites through the top surface so that the bore can be completed from that side without rough edges or splitting.

The legs are now fitted into their holes and measured and later drilled for the ½-in. dowels as stretchers. For additional stiffening a long dowel can be centered to tie in the two side stretchers, if desired.

When the legs are removed, their tenoned ends are halved with saw kerfs in the same direction, (across the grain of the table top), and small wedges are prepared for spreading these slits about two thirds of the way down. Glue is applied to each tenon, which is then malleted tightly into place and the wedge driven home (A, Figure 2.30). Stretchers must be glued into place before the

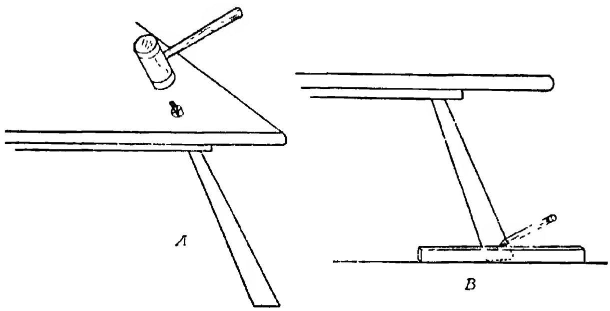


FIG. 2.30. *A*, Wedging the leg. *B*, Leveling a table.

second leg of each pair is driven into the top. When the glue has dried, the protruding leg ends are cut and sanded flush with the upper surface of the table top.

If it is found on final assembly that the legs are uneven, causing the table to "teeter," it can be placed on a flat surface, tilted until level, and while held firmly in that position marked by using a straightedge of minimum thickness successively around each leg, as in B, Figure 2.30. When all lines are carefully connected and sawed, the table will rest firmly and level on all four legs.

Cobbler's Bench. Of recent years there has appeared a vogue for artisans' workbenches as "conversational pieces" in the living room. Milk benches are converted into bars and sideboards, cobblers' benches become coffee tables, and blacksmiths' tool boxes are dramatized into magazine racks. Of these perhaps the most eye-arresting is the lowly cobbler's bench (Figure 2.31). Simulating, as it does, rough carpentry and long usage, it is extremely easy to make.

Because of its availability and hardness the cobbler or the village carpenter would no doubt have chosen maple for the construction of this heavy-duty workbench. Furthermore, as insurance against splitting, the wise craftsman would have constructed the top in two pieces, cleated together where the legs joined it. Therefore, having glued up the top, the next step in the production of a modern replica is to prepare the legs for insertion into the cleats.

Since the rear cleat also acts as a drawer guide it must be rabbeted for the

sides should be placed in the bottom of the large can to separate the two bottoms. The glue is placed in the smaller receptacle, covered with water, and allowed to soak from 3 to 8 hours, until it swells to a jellylike mass without liquefying.

When the glue is to be used, the bottom section of the glue-pot assembly is filled with sufficient water and the glue is heated to about 150° F., being stirred the while but not with sufficient force to produce air bubbles. A good glue will give off no objectionable odors while being heated.

When the glue becomes creamy and drips from the stirring paddle in long strings, it is ready for use. It should be maintained at room temperature thereafter until the work is completed. In using hot glue the wood should be warmed first to prevent chilling the glue into setting before pressure can be properly applied. Animal glue is not waterproof.

Fish Glue. Fish glue comes in liquid form, which is especially useful for the occasional worker because haste in its application is not required. In fact, after it has been brushed on to both of the surfaces to be joined, it is permitted to stand for a few minutes to observe whether excess absorption will require further touching up before the joint is permanently assembled. Although not as strong as animal glue it is excellent for softwoods. Fish glue is not waterproof and may require warming during cold weather.

Casein Glue. Casein glue has become increasingly popular in the home workshop, owing to its strength and quick-setting and slow-curing properties. It comes packaged in powdered form with full directions for mixing it with *cold* water. Since it sets within 4 hours, only enough should be mixed for the job on hand. It should be applied like liquid (fish) glue, and the clamps should be put on within 20 minutes. The result is a waterproof, heat-resistant joint, stronger than the wood itself. Casein glue will deteriorate when exposed to salt water or the action of molds. Latest reports indicate, however, that glue can be made resistant to mold in warm, wet, tropical climates, by adding 5 per cent of an organic mercury fungicide-bactericide to the dry glue; before the wood joints are bonded together, one side is treated with a diluted formaldehyde solution.

Plastic Glue. Plastic glue also comes in powdered form to be mixed with cold water, according to directions. Unlike casein glue, however, the mixture will last longer—about 6 hours at 70° down to 45 minutes at 100°; in hot weather the life of the mix can be prolonged by setting it in cold water. It is heat resistant up to about 150° F. and waterproof to both fresh and salt water.

Resin-type plastic is an excellent, waterproof adhesive, which comes in two forms. The full-strength liquid plastic is syrupy and light colored, and requires the addition of a hardening agent just before being used. This is made by adding C.P. hydrochloric acid, 3 volumes to 1 volume of distilled water, well stirred in a glass or porcelain container. A thin layer is brushed on both surfaces to be joined, before pressure is applied. At room temperature from 4 to 12 hours will be required for full hardening. This time can be reduced to about a half hour if the work can be heated to 150° F.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4–6	⅞	10½–7	48	Top
4	¼	1¾	182 lin.	Edge banding
2	3¼	—	28⅝	Legs
2	⅞	5¾	21	Leg cleats

Drawer Compartments (2)

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
8	1⅝	1⅝	28⅝	Corner uprights
6	¼	21¾	24⅞	Side and back panels (plywood)
4	¾	1⅝	17¾	Top and bottom rails
6	¾	⅞	17¾	Drawer rails
12	¾	2¼	19¼	Side rails
16	¾	2¼	18⅝	Slides
16	¾	1¼	17¾	Guides

Drawers

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
8	¾	5½	17¾	Fronts
16	⅜	4¾	19¾	Sides
8	½	4¾	17⅜	Backs
8	¼	17⅜	19¼	Bottoms (plywood)

of economy, stuck panels are used for the sides and backs, with tapered feet; solid stock with separate, inset short legs, will more accurately reflect the modern note set by the tapered, cylindrical legs.

The four side panels are made up and set aside, after dadoes have been cut on the inside edges of the back uprights to receive the back panels. Meanwhile the frames for the drawers are made up into eight semi-identical sets, with the rear rails omitted. As shown in the drawing, the rear ends of the side rails can either be mortised into the rear uprights (*A*), or rest upon blocks glued and screwed to the uprights, as in (*B*). The sides of one set of four frames are doweled

into place on one side, after the tops and bottoms of the uprights have been prepared to receive the top and bottom rails, by means of dowels or mortise and tenons. Before the opposite side panel is attached, the rear top and bottom rails, with the rear panel in place between its dadoes, is secured in position. The second side panel is secured in place after the top and bottom rails have been fastened into position. The guides are toenailed in place at the same time the side rails are fastened. Dust panels under the bottom drawers are optional.

If the desk is to be subjugated to much moving, it will be advisable to reinforce the two drawer compartments along their top back rails by a single member 46 in. long, notched to receive the tops of the rear uprights.

The drawers are of conventional, flush-type construction, with the fronts of the top three drawers lipped to conceal the drawer rails. Drawer pulls are constructed to match other furniture, or fingertip recesses can be gouged out along the insides of the inner uprights, handles or pulls thus being eliminated.

The cylindrical legs are tapered to 2 in. at their bottoms with their tops cut into wide tenons, which fit through holes in cleats screwed to the upper back rails. The tenons are saw-kerfed and wedged tightly in place before they are cut off flush with the upper surface of the cleats.

Bachelor Chest. When space is not available for a desk or writing table, a chest of drawers with a slide that can be pulled out for writing (Figure 2.66) will obviate the necessity of clearing off the top whenever a pen is taken in hand. While this requires some space to be allocated for writing materials in one of the drawers, it reduces the height of the chest to a standard 31½ in., suitable for unit assemblies. The alternate method of employing a false drawer front as a drop leaf to form a writing shelf raises the chest by the width of the drop front.

The sides are glued up with dowels to form pieces 18 in. wide; the top will glue up into an 18½-in. piece, a ½-in. overhang being allowed at the front. After the glue has set and the joints have been planed smooth, ¼-in. rabbets are cut ½ in. wide along the inside of the rear edges of the sides to receive the plywood back. A similar rabbet is cut in the upper inside edge of the back base piece.

The front top rail dovetails into corresponding lapped sockets in the tops of the sidepieces to lock that part of the assembly together, as shown in detail A of Figure 2.66. The front base member is mitered into the lower front edges of the side pieces. The miter on the side members is stopped by a horizontal saw cut at the height of the base piece. This gives an opportunity for an accurate job of doweling. In order to lock the bottoms together at the miter, the upper one of a pair of dowels protrudes from the top of the side member, while the lower one extends from the bottom of the base member, fitting into accurately drilled holes in the opposite members of the miter joint, as pictured in B.

All other front rails and all of the back rails of the frame assemblies are doweled into the sides of the chest. To facilitate final assembly the six frames are glued separately, with the center rails and guides screwed into place for the correspondingly rabbeted center drawer rails, which fasten to the bottoms of the

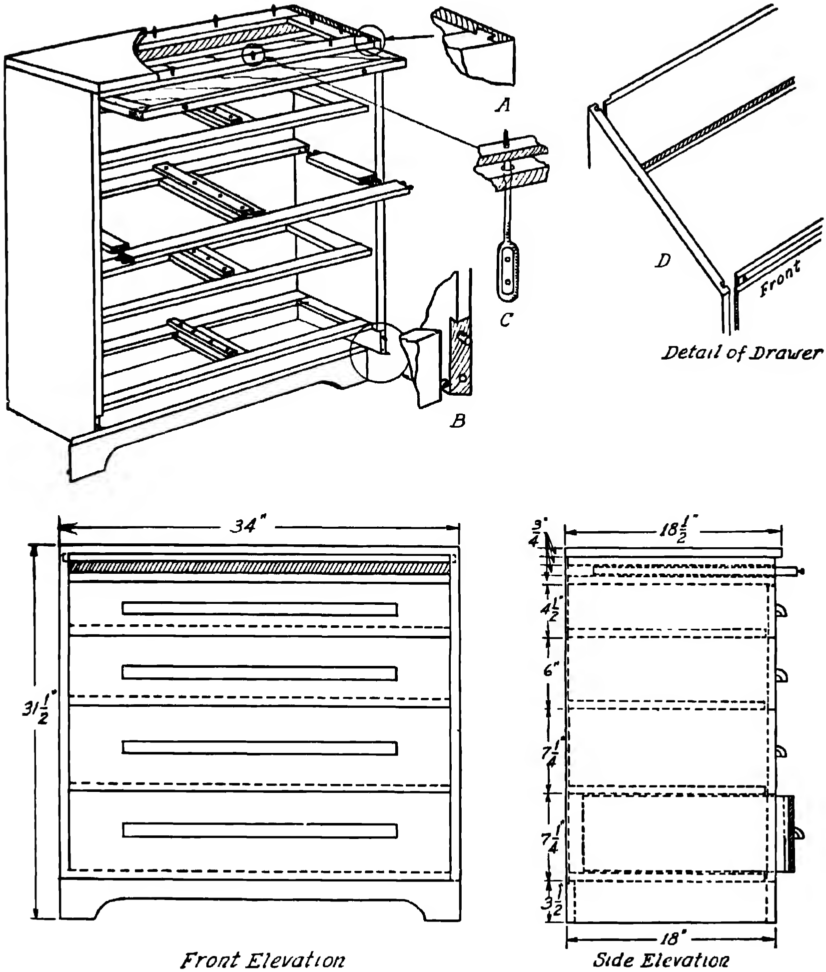


Fig. 2 66. Bachelor chest.

drawers. The two top frames are ¾ in. deeper than the other frames, extending flush with the outer edges of the chest's sides.

The bottom frame is rabbeted along its inner bottom edges to receive the ¼-in. dust panel. Screws may be inserted into the side rails of all frames for attachment to the side members of the chest; additional holes are drilled from underneath the top frame members for fastening the top of the chest in place. Holes to permit the insertion of the screwdriver must be bored at corresponding points in the sliding shelf frame, as shown in detail C.

The shelf is made up like a drawing board, with cleats doweled or mortised

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2–3	$\frac{3}{4}$	$9\frac{1}{4}$–$6\frac{7}{16}$	34	Top ($18\frac{1}{2}$ in. wide)
2–3	$\frac{3}{4}$	9–6	$30\frac{3}{4}$	Sides (18 in. wide)
1	$\frac{3}{4}$	$3\frac{1}{2}$	34	Base, front
1	$\frac{3}{4}$	$3\frac{1}{2}$	$32\frac{1}{2}$	Base, back
1	$\frac{1}{4}$	$27\frac{1}{2}$	$33\frac{1}{2}$	Back (plywood)
1	$\frac{3}{4}$	2	$33\frac{1}{2}$	Front rail (dovetailed)
4	$\frac{3}{4}$	2	$13\frac{3}{4}$	Side rails (top frames)
11	$\frac{3}{4}$	2	$32\frac{1}{2}$	Front and back rails
4	$\frac{3}{4}$	$2\frac{3}{4}$	13	Center rails
8	$\frac{3}{4}$	2	13	Side rails
2	$\frac{3}{4}$	$8\frac{1}{8}$	$30\frac{1}{2}$	Shelf ($17\frac{3}{4}$ in. wide)
2	$\frac{3}{4}$	1	$17\frac{3}{4}$	Cleats, shelf edges
1	$\frac{3}{4}$	$1\frac{1}{2}$	$32\frac{1}{2}$	Shelf front
4	$\frac{3}{8}$	$\frac{3}{4}$	17	Drawer guides
4	$\frac{3}{4}$	$1\frac{3}{4}$	17	Drawer slides
1	$\frac{3}{4}$	$4\frac{1}{2}$	$32\frac{1}{2}$	Drawer front (top)
1	$\frac{3}{4}$	6	$32\frac{1}{2}$	Drawer front (2nd)
2	$\frac{3}{4}$	$7\frac{1}{4}$	$32\frac{1}{2}$	Drawer fronts
2	$\frac{1}{2}$	$3\frac{3}{4}$	$17\frac{1}{2}$	Drawer sides (top)
2	$\frac{1}{2}$	$5\frac{1}{4}$	$17\frac{1}{2}$	Drawer sides (2nd)
4	$\frac{1}{2}$	$6\frac{1}{2}$	$17\frac{1}{2}$	Drawer sides
1	$\frac{1}{2}$	$3\frac{3}{4}$	32	Drawer back (top)
1	$\frac{1}{2}$	$5\frac{1}{4}$	32	Drawer back (2nd)
2	$\frac{1}{2}$	$6\frac{1}{2}$	32	Drawer backs
4	$\frac{1}{4}$	17	32	Drawer bottoms (plywood)
1	$\frac{1}{4}$	17	32	Dust shelf (plywood)

and tenoned along the edges to prevent warping. The shelf front edging strip $1\frac{1}{2}$ in. wide, can be doweled into its position, and has a mitered or splined mitered corners.

All frames are fastened to one side of the chest before the other side is assembled. After the screws have been driven home, the plywood back panel is fitted into its rabbeted grooves. If it has been cut squarely it will automatically square up the entire assembly. It is not only screwed into its rabbets, but across the rear edges of each frame, for added strength.

The top of the chest can now be screwed into place by inserting the screwdriver through the holes in the shelf frame. The latter should be fitted in place with a

$\frac{1}{16}$- or $\frac{1}{8}$-in. clearance to provide easy movement for the shelf. The same clearance should be provided between the top and bottom edges of the drawer fronts. The dimensions given in the lumber list do not provide for this. A small projecting dowel is inserted on the underside of the rear of the shelf to prevent its being pulled out too far.

Dovetailed drawers are the best construction; however, the measurements listed were predicated on the strong but simpler drawer joint for the front corners, illustrated in detail D, with a dado and rabbet joint at the rear corners. The plywood bottom is dadoed in place before the drawer frame is assembled.

A center drawer slide to straddle the center guides in the frames consists of a dado $\frac{3}{4}$ in. wide, routed $\frac{3}{8}$ in. deep in a $\frac{3}{4}$ in. $\times$ $1\frac{1}{2}$ in. piece of stock, which is bradded to the bottoms of each drawer.

The dust panel can now be attached in its rabbets to complete the assembly. If desired, additional strength can be afforded the bottom corners by adding corner blocks or cleats, after the dust panel has been installed.

Vanity Chest. A comparable piece of furniture for the female sex might be called a "spinster chest." With the sliding shelf entirely eliminated, a drawer

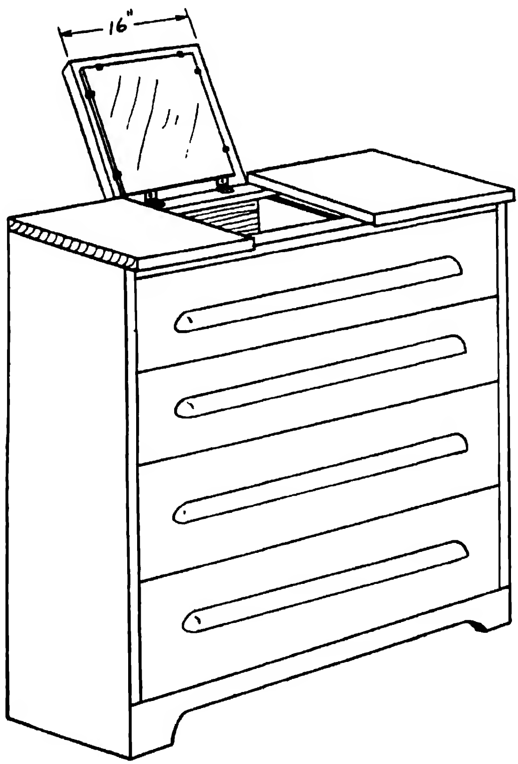


Fig. 2.67. Vanity chest.

5½ in. deep results, with a 6-in. front overlapping its drawer rail at the front. This drawer is compartmented by dadoing in two 17-in. dividers to form a 16-in. central compartment midway between two 7¾-in. outer sections.

The top of the chest is cut across its width into a center leaf 16 in. wide, 9 in. from either end, as indicated in Figure 2.67. This center leaf is fastened to the rear of the top frame assembly with invisible hinges or a 16-in. continuous, piano-type hinge, and has a mirror fastened in place with metal brackets or a wooden molding. If desired, a lid stay can be fastened in place to hold the mirrored underside at a special angle; otherwise it will tilt back to rest against the wall behind the chest.

This makes a standard-size chest whose drawer tops and bottoms will line up with the bachelor chest, when placed side by side with it.

Unit Assemblies. The vogue for unit assemblies of furniture is an architectural approach to modern styling. Built to a uniform height, the various pieces can be "butted" together, side by side, to form various combinations of seemingly continuous, solid pieces of furniture. By adding a piece at a time, the strain on the budget is eased, the ingenious housewife is afforded facilities for new arrangements, and the means are provided for the wall-to-wall arrangements so economical in a limited space. While the average householder is not yet attracted to architectural simplicity in the living room or boudoir, unless dictated by cramped living conditions, nevertheless there is a distinct trend toward the simplification of functional rooms such as the dining room, a masculine bedroom, or neuter guest rooms. It was for this reason that the paneled bed, bachelor and vanity chests, and the writing table, previously described, were dimensioned to a common height.

By constructing a pair of commodes with 16-in. solid tops of dimensions otherwise identical with those of the vanity chest, two units will be provided that can be set on either side of the bed, for a built-in headboard effect, or on the sides of the writing table to form a vanity.

For the dining room, two of the small commodes placed against the ends of a solid-topped chest of drawers will provide an authentic sideboard. If desired, the chest can be built 10 in. wider with a shallow, compartmented half drawer, lined with tarnish-proof felt, sliding on cleats in the inside of the top drawer for storing silverware. The lower two or three drawers can be omitted and replaced by shelves, recessed to take ¾-in. plywood doors.

When space is to be conserved, or in the den, rumpus room, or nursery, a wall-to-wall installation will probably require the construction of at least one odd-sized piece. Here, too, panel doors may alternate with tiers of drawers, together with one or more bookcase, 31½ in. high and 10 to 11 in. deep, constructed with the typical mitered 3½-in. bases, and with flush sides. Units can be built to house radios, and drawers made with solid bottoms to hold phonograph models. The possibilities are limitless; several designs are available from the preceding pages of this chapter.

CUPBOARDS

When the migratory household chest became stationary, an ingenious amateur furniture designer upended it, inserted shelving, and proudly offered it to his harassed wife as storage for her cups and dishes. In varying forms these cupboards retain their importance today, not only as actual storage space, but for the display of prized possessions.

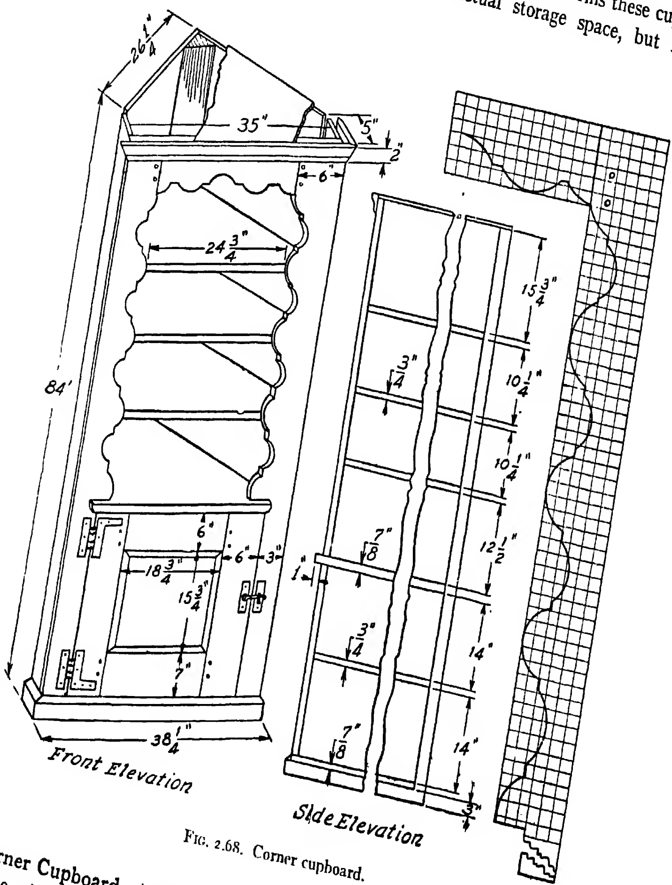


FIG. 2.68. Corner cupboard.

Corner Cupboard. A dining room furnished in the Colonial manner is hardly complete without a knotty pine cupboard (Figure 2.68) frugally constructed to take advantage of the otherwise waste space in one or more corners. Painted white or ivory, such a cabinet will blend with other decorative treatments.

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	3/16	26¼	84	Back (plywood)
1	1⅝	1⅝	84	Corner upright
2	⅞	5	84	Side uprights
1	¼	34	34	Top
1	⅞	6	24¾	Headpiece, front framing
2	⅞	6	84	Uprights, front framing
1	¾	3	30	Cleat, headpiece
3–4	⅞	35	35	Bottom and bottom open shelf
12–16	¾	31¼	31¼	Shelves (4)
3	¾	3	50	Base
2	⅞	6	28¾	Stiles, door
1	⅞	6	21¾	Top rail, door
1	⅞	7	21¾	Bottom rail, door
2–3	¾	17¼	20¼	Panel, door
3		2	50	Cove molding
3		¾	50	Quarter-round molding

The uprights and headpiece for the front framing are cut similar to the design in Figure 2.68, and cleated together from the rear to form a flush top edge. A mortise and tenon joint at this point is unnecessarily strong, and can be simulated by dowel pegs, as indicated. The decision must be made at this time whether the shelves and bottom are to be dadoed into the front framing, nailed with countersunk finishing nails, supported on angle irons, or cleated.

The corner upright is ripped to form a triangular member to which the plywood is nailed or screwed to form a 90° angle. The side uprights can now be beveled to butt out parallel from the plywood backing to which they are firmly fastened.

After the front framing is checked for fit, a paper templet can be cut for the triangular shelves. These are made up from available short widths, with the lowest open shelf overhanging about 1 in.; all other shelves excepting the bottom, are butted against the rear face of the front framing. The front edge of the bottom extends out flush with the outer face of the front framing. The shelves can be fastened to the plywood backing from the rear, and to the side uprights before the front facing is fastened in place. The lowest open shelf is half lapped around the front framing. If desired, a ⅛-in. groove can be cut 1 in. from the back of each shelf for a plate rail.

The base is mitered at the corners, as is the quarter-round molding with which

it is trimmed. Before fastening the base assembly in place it should be checked to insure that the door will clear the upper edge of the molding.

The top is cut out to fit inside the plywood backing. A crown molding of 2-in. mitered cove stock is added for trim.

The door panel is raised by a 1-in. bevel on all four edges, which fit into grooves in the door frame. The latter is jointed with double tenons 1½ in. long, pegged as shown.

Wrought iron H-type hinges are used together with a wrought iron catch (Figure 2.68). If these are not available substitutes can be assembled by using butt hinges against which black painted flat angle irons and repair plates are screwed in proper position. A barn-door latch can be substituted for the wrought iron replica, or a round wooden knob used with a modern bullet catch.

The inside of these corner cabinets was often covered with Colonial-type wallpaper or painted a very flat tint of apple green, dusty rose, light blue, ivory or white, to set off the china and glassware display.

Hunting Board Hutch. A companion piece for the Colonial corner cupboard is a pegged hunting-board buffet with a removable hutch top for displaying tankards, china, and glassware (Figure 2.69). It provides ample space for the average buffet meals, including the traditional hunt breakfast.

Lumber List
Buffet

Pieces		*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
	2–3	⅞	6½–9½	50	Top (19 in. wide)
(*A*)	2–3	⅞	6–9	36	Sides (18 in. wide)
(*B*)	1	⅞	5½	48	Base Front
(*C*)	2	⅞	3	30½	Uprights
(*D*)	1	⅞	5½	47½	Base, back (dovetailed)
(*E*)	1	¼	35	47¼	Back (plywood)
(*F*)	1	⅞	1¾	46¼	Front rail
(*G*)	1	⅞	5	47½	Back rail (dovetailed)
(*H*)	1	⅞	1¾	44	Drawer rail
(*I*)	4	⅞	1¾	14¼	Side rails (runs)
(*J*)	1	⅞	1½	46¼	Back rail, drawer frame
(*K*)	2	¾	¾	18	Drawer guides, single
(*L*)	1	¾	3	18	Double drawer guide, center
(*M*)	1	⅞	3	21¾	Divider
(*N*)	1	¾	3	21¾	Rear post
(*P*)	2	¾	18	46¼	Shelf and bottom

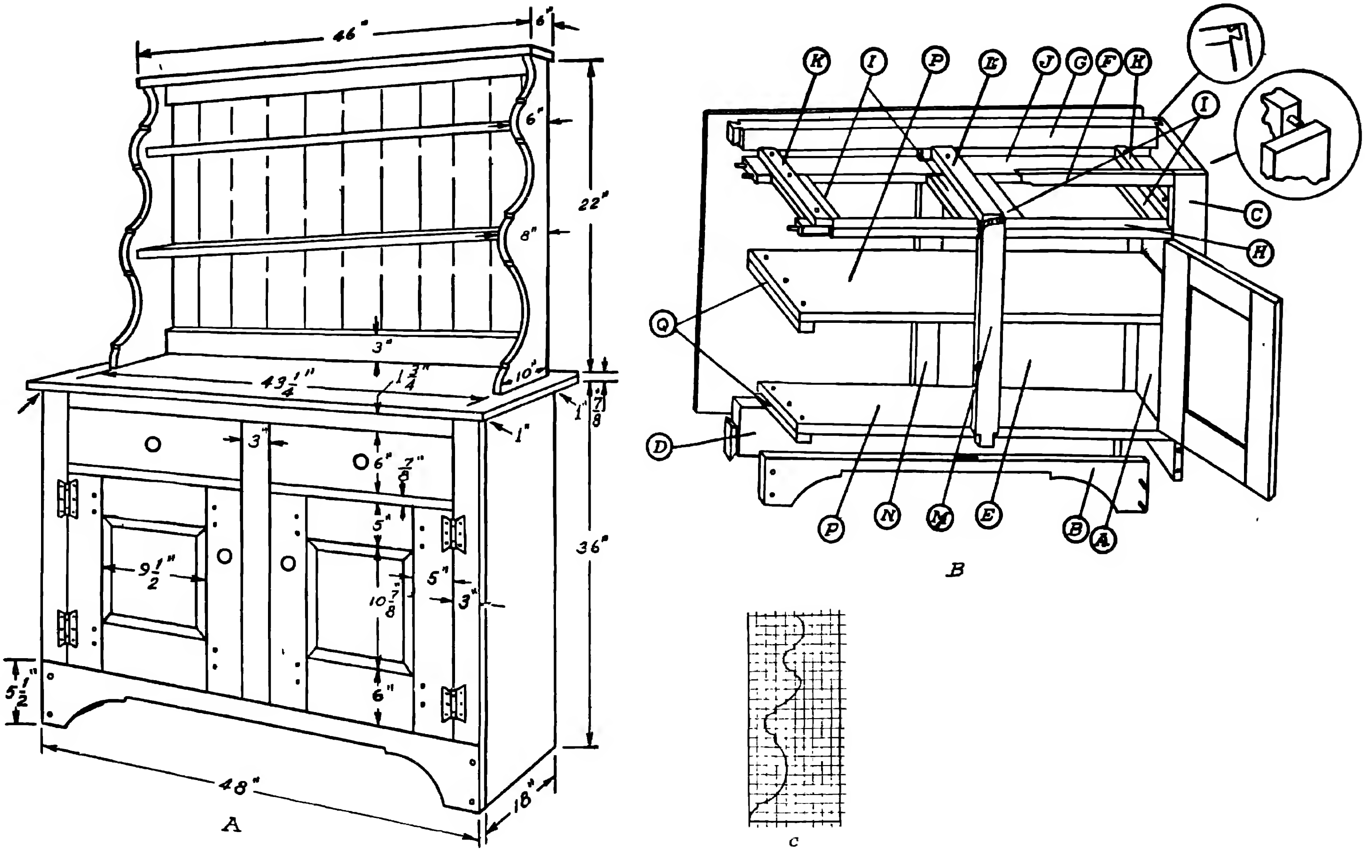


Fig. 269. Hunting-board hutch.

Buffet—*Continued*

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
(*Q*) 4	¾	1	18	Cleats
(*I*) 1	¾	5	15¾	(Alternate) double drawer rail, center
4	⅞	5	21⅞	Stiles, doors
2	⅞	5	19½	Upper rails, doors
2	⅞	6	19½	Lower rails, doors
2	¾	10	11⅜	Panels, doors
2	⅞	6	19½	Drawer fronts
4	½	6	17¼	Drawer sides
2	½	5	5½	Drawer backs
2	¼	5½	16⅝	Drawer bottoms (plywood)

Hutch Top

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	⅞	6	47	Top
2	⅞	10	22	Sides
1	¾	2	44¼	Top rail (dovetailed)
1	¾	3	44¼	Bottom rail (dovetailed)
1	⅞	6	44¼	Upper shelf (dadoed)
1	⅞	8	44¼	Lower shelf (dadoed)
11–14	½	3–4	22	Back

The construction of the buffet follows in general the procedure employed in assembling the bachelor chest in a preceding section. The upper back rail (*G*) can be half-lap-dovetailed into the sides (*A*) or doweled, as preferred; the same is true of the back base piece (*D*). The front base (*B*) is visibly pegged in place, while the uprights (*C*) are blind-doweled to the edges of the sides. An alternate method would be to miter both the front base and the uprights to the side edges of the buffet.

As indicated in B of Figure 2.69, the drawer rail (*H*) is recessed to receive the uprights (*C*) and divider (*M*). The double drawer frame is then doweled together with the end rails (*I*) 1⅜ in. in from the ends of the front and back rails so that the drawer guides (*K*) can be screwed on top, flush with the inner edges of the uprights, after the buffet is assembled. The two center rails are

doweled so that ¾ in. of each inner edge is behind the upright divider. A single 5-in. rail can be substituted for the two center rails if desired, permitting an overlap of 1 in. on either side of the upright divider for use as drawer runs. A 3-in. guide (*L*) is screwed on top of this for use by both drawers.

The buffet is assembled one side at a time. First the front uprights (*C*) and base (*B*) are doweled in position and the frame is turned over to permit dovetailing or doweling the rear rail (*G*) and base (*D*). The drawer frame can now be fastened in place from the rear. An optional method to blind-doweling the rail ends (*J, H*) into the sides is to use cleats, as in the case of the shelf and bottom (*P*).

While the glue is still soft, the divider (*M*) is mortised and tenoned or doweled into the center top edge of the front base (*B*), and blind-doweled to the recess in the drawer rail (*H*). The top rail (*F*) is doweled into the uprights (*C*) and mortised and tenoned or doweled to the top of the divider (*M*), as shown in B, Figure 2.69. The rear center post (*N*) is secured in like manner. The opposite side is fastened in similar fashion and the plywood back screwed in place ⅜ in. in from the side edges.

Two doors with raised panels similar to those described for the corner cupboard are constructed with pegged mortise and tenon joints, dadoed framing, and beveled panels. When the carcass is dry, the doors are fitted in place, a cleat being used on the underside of the drawer rail as a stop. H-type hinges are suitable hardware and can be imitated from butt hinges flanked by flat repair plates, as explained in regard to the L hinges for the corner cupboard. Butterfly hinges can be simulated by using butt hinges flanked by flaring strips of sheet lead, screwed opposite the hinge butt and painted black. Appropriate hardware or plain wood round or square knobs complete the doors.

The drawers are of conventional design with wooden knobs. The top of the buffet is fastened in place flush with the back and overhanging 1 in. on sides and front. Its edges should be well rounded to represent age and use.

The removable hutch top is nothing more than a simple set of shelves resting on the rear of the buffet top. The sides are cut simultaneously from two pieces of ⅞-in. stock according to the pattern. Stopped dadoes are routed for the shelves and a lapped dovetail cut for the lower rail so that it will be inset ½ in. from the rear edges of the sides, permitting the ½-in backing to set flush. The upper rail can be blind-doweled in place, since the top is through-doweled to the top edges of the sidepieces. It has a 1-in. overhang on front and sides, and a ½-in. overhang at the back to cover the tops of the backing.

The ½-in. backpieces are nailed or screwed to rails and rear edges of the shelves, flush with the outer edges of the sidepieces. If preferred, the pieces can be beveled on their inside faces to form V grooves when fastened. The shelf edges and top should be rounded and smoothed.

For rigidity, two large metal repair plates are screwed at either end of the lower rail extending down over the back rail of the buffet, where they can be

fastened with one or more screws. The resulting ensemble is finished in a warm, natural Colonial tone and waxed as explained in Chapter 5.

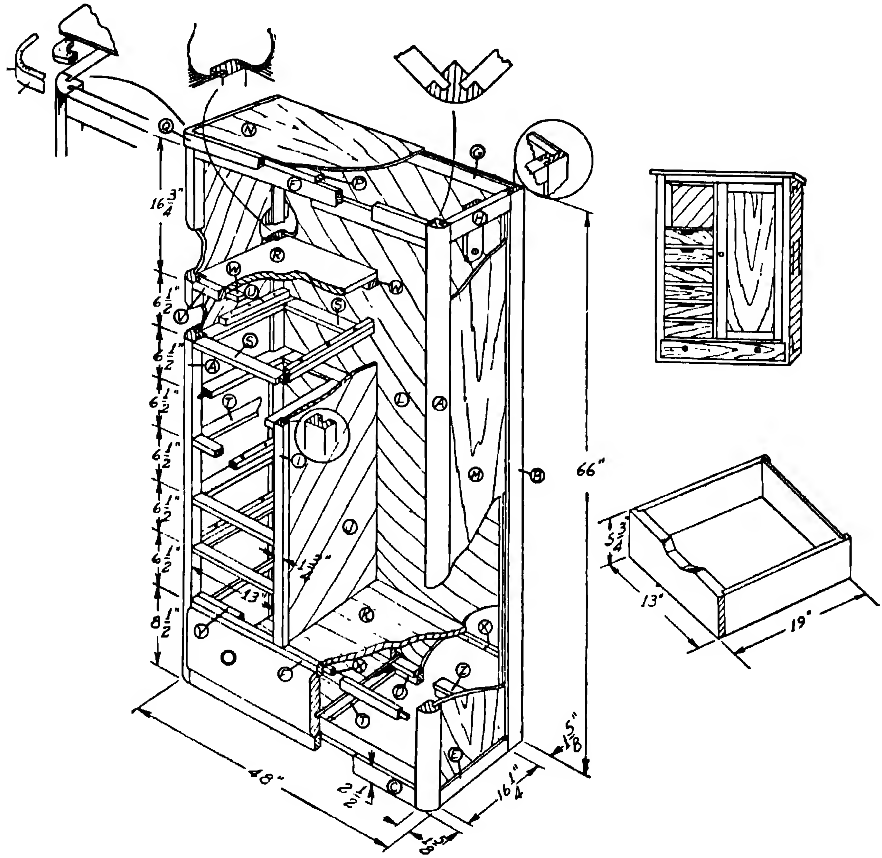


FIG. 2.70. Chifforobe.

Chifforobe. To augment insufficient closet space, a simply constructed wardrobe (Figure 2.70) offers a satisfactory solution. It can be finished as a matching piece of furniture or painted to blend with the walls or woodwork. If adequate drawer space already exists elsewhere, the shirt-size drawer section of the combined chiffonier and wardrobe described below can be eliminated, and a second wardrobe compartment substituted, providing increased space for storing clothing. The wide bottom drawer is another optional feature for the storage of extra blankets.

The casework of the chifforobe is the familiar panel type of construction which economizes in solid stock requirements. The front corners of the two front stiles

(*A*), illustrated in Figure 2.70, are beveled then rounded for a modern appearance. They are grooved along their inner edges to take the plywood panels (*M*) and mortised at top and bottom to take the tenons of the front rail (*F*) and base (*C*). In addition to grooving the rear stiles (*B*) for the side panels, a ½-in. rabbet ¼ in. deep is cut along the inner edge to receive the plywood back (*L*). This groove is deepened to 1 in. at top and bottom to house the top rear rail (*G*), and base (*D*). After the side rails (*H* and *E*) have been grooved, the two side panels can be made up.

Meanwhile the frames for the six drawers can be cut and doweled together. The frame for the long bottom drawer is stiffened by a center piece (*T*).

Tenons are cut (or dowels inserted) in front rails (*F*), base (*C, D*), and parti-

LUMBER LIST

Pieces		*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
(*A*)	2	1⅝	1⅝	66	Front corner stiles
(*B*)	2	¾	1⅝	66	Rear corner stiles
(*C*)	1	¾	2½	45¾	Base, front
(*D*)	1	¾	1¾	47	Base, back
(*E*)	2	¾	2½	17¼	Base, sides
(*F*)	2	¾	1¾	45¾	Top and bottom front rails
(*G*)	1	¾	1¾	47	Top back rail
(*H*)	2	¾	1¾	17¼	Top side rails
(*I*)	1	¾	1¾	56¾	Partition facing
(*J*)	1	¾	18⅞	57½	Partition
(*K*)	1	¾	18½	32⅝	Floor
(*L*)	1	¼	47½	64	Back (plywood)
(*M*)	2	¼	17¼	62½	Sides (plywood)
(*N*)	1	¼	19½	48	Top (plywood)
(*P*)	3	¾	1¼	87	Filler, top
(*Q*)	3	½	1	88	Binder, top edge
(*R*)	1	½	14⅝	17⅝	Shelf
(*S*)	11	¾	1⅝	13½	Drawer rails (front and back)
(*T*)	13	¾	1¾	16¼	Drawer slides
(*U*)	12	¾	⅞	16¼	Drawer guides
(*V*)	11	¾	1⅝	14⅜	Drawer rails (back)
(*W*)	2	¾	¾	14⅝	Shelf cleats
(*X*)	2	¾	1	44¾	Floor cleats
(*Y*)	1	⅞	1	13	Filler strip
(*Z*)	1	¾	1⅝	46	Rear-drawer rail

Drawers

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	¾	5	45½	Bottom-drawer front*
1	½	4¼	44¾	Drawer back
2	½	4¼	18	Drawer sides
6	¾	5¾	13	Drawer fronts
6	½	5¾	12½	Drawer backs
12	½	5¾	19	Drawer sides
6	¼	12½	18	Bottoms (plywood)

Door

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	2	55¾	Stiles
2	¾	2	27	Rails
1	¼	27	52¼	Panel (plywood)

*(Decrease front, back, and sides to 3⅞ in for top drawer)

tion facing (*I*). The latter is grooved to house partition (*J*); its tenoned ends fit into mortises bored in rails (*F*). Shelf rail (*V*) is tenoned (or doweled) into stile (*A*) and doweled into facing strip (*I*).

After a check fitting of the sides to rails (*F*) and (*C*) and upright (*I*), the smaller drawer and the shelf frames can be marked, fitted and glued into the partition (*J*) and its facing (*I*).

The back rail (*G*) and rear base (*D*) can now be assembled to the side panels. The long bottom-drawer frame is now inserted and fastened, with its rear rail on top of base (*D*), allowing a ¼-in. ledge at the rear for the plywood back.

Rail (*F*) with filler strip (*Y*) and floor cleat (*X*) screwed in place is now attached to the two sides, and the floor (*K*) dropped in place.

The complete partition assembly (*J, I*) can now be fitted in place, with the tenoned or doweled end of facing strip (*I*) housed in lower rail (*F*), and partition (*J*) resting on floor (*K*).

The upper rail (*F*) is fitted over the upper end of facing strip (*I*) with its tenoned ends inserted in their mortises in the stiles (*A*).

The backing can now be screwed to the back stiles (*B*), shelf (*R*) (when the latter is fitted to its cleats (*W*)), as well as to all rear-drawer rails (*S, Z*).

A filler strip (*P*) is cut in five parts to extend ¾ in. over the top stiles and

rails. Separate pieces are cut to fit over the round faces of the stiles. The rear top rail (*G*) can be fitted to extend upward ¾ in. to serve as a rear filler strip. The plywood top is then bradded in place and edging strip (*Q*) saw-kerfed on the inside corners to bend around the corners.

Drawer guides (*U*) are screwed in place on all frames if this was not done when they were assembled. The drawers are of conventional construction with cutout fingertip holds. The front of the bottom drawer is lipped by cutting a ⅜-in. rabbet around its outer edges.

The door is of stuck-frame panel construction and can be butt-hinged, flush with the rails and stiles of the front, in which case the door stop shown behind the top of front rail (*F*) will be required. An optional method is to lip the door to match the lower drawer. This will lengthen the door by ¾ in. and will require the use of offset hinges.

A mirror is cut to fit the rear of the compartment above the shelf. If desired, a fluorescent tube can be installed to the back of the top rail (*F*) above the shelf in the same manner as the fixtures in the compartment headboard, Chapter 4.

Chests

Always a most important piece of furniture in one form or another during the early centuries, chests have survived in our present stabilized way of life, frequently in the form of cedar or cedar-lined storage containers, whose aromatic odor is credited with discouraging the attacks of rapacious moths. With tongue and grooved cedar lining available in most lumber yards, it is not difficult to assemble homemade chests that will effectively complement other household furniture, instead of being relegated to attics or other out-of-sight storage rooms.

Pirate Chest. For storing toys, playthings, and all sorts of children's gear, a rough-and-ready, oversized box is just what the doctor ordered. By calling it a pirate chest and decorating it with appropriate emblems, the possibilities of youthful cooperation in the matter of picking up and storing away toys and games are hopefully exploited. The dimensions given are for average use. If the height of the bed end or sides permits, space can be saved by constructing the chest so that it can be pushed under the bed when not in use. The pushing under or pulling out process will be greatly accelerated if casters or roller skate wheels are screwed to the corners.

As illustrated in Figure 2.71, the front is sloped after the manner of a Cape Cod seaman's chest, and all joints are butted and screwed. Inasmuch as cleats are used on front and top, various available widths of ¾-in. wood can be used, without doweling. To prevent warping, heartwood and sapwood sides should be alternated.

Strap hinges and a padlock hasp are the only hardware required, unless a section of chain is used as a lid stop. The wood can be left natural and the cleats painted black to simulate iron. Rope handles are knotted through twin holes

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4–6	¾	4½–6¾	15¼	Sides (13½ in. high)
2–4	¾	3½–7	30	Front (14 in. wide)
2–4	¾	3½–6¾	28½	Back (13½ in. high)
2–3	¾	4–6	30¼	Lid (12 in. wide)
2–4	¾	4–8	28½	Bottom (16 in. wide)
2	¾	2	12	Lid skirt
4	¾	1½	12	Cleats, front
4	¾	1½	14	Cleats, top

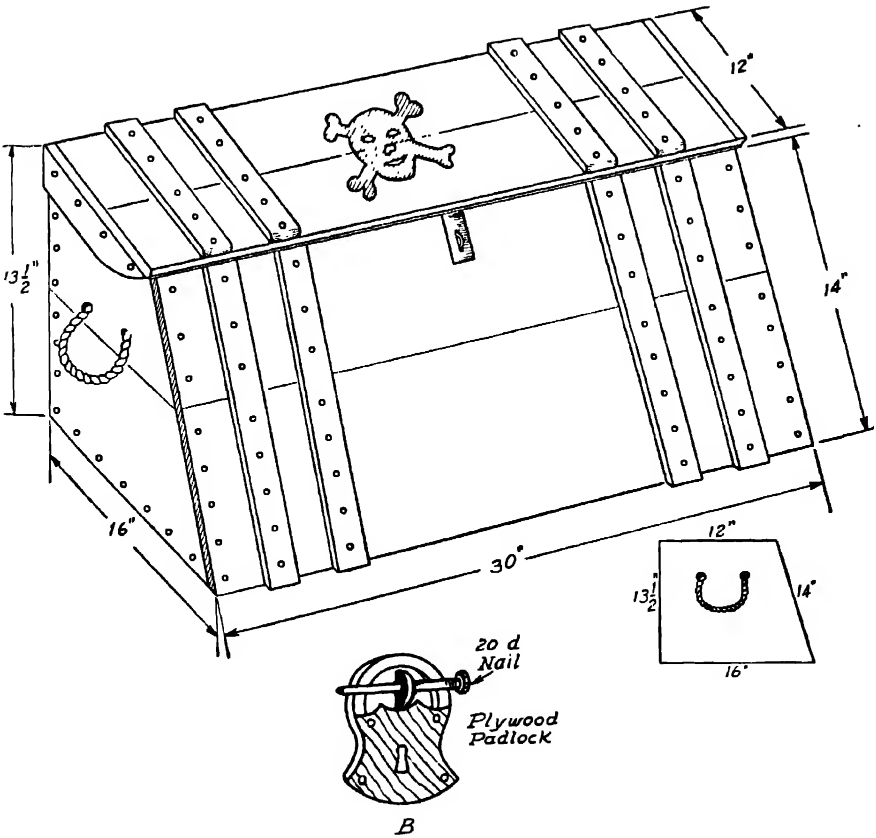


Fig. 2.71. Pirate chest.

bored in the ends, and large upholsterers' tacks can be driven in over the exposed screwheads, to preserve a massive, studded effect.

Padlock. To satisfy youthful insistance on realism, a massive-appearing plywood padlock can be sawed out to fit over the hasp, as pictured in detail B of the illustration. A small whittled peg or section of dowel, painted black, will serve to confirm the youthful owner's contention that his treasures are safely locked up.

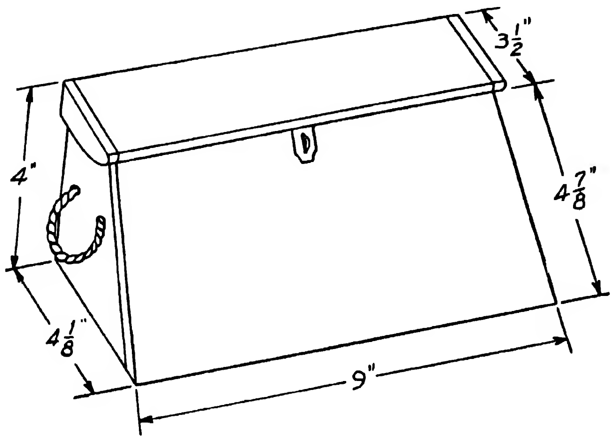


FIG. 2.72. Bureau catchall.

Bureau Catchall. By decreasing the pirate chest's measurements to those indicated in Figure 2.72, a small box for odds and ends on the bureau or dresser will result. Glued together from ¼-in. plywood, it represents a satisfying one-evening project. The cleats can be omitted, and small brass hinges and padlock hasp used for hardware.

Pennsylvania Dutch Dower Chest. A sturdy hope chest of early Pennsylvania origin (Figure 2.73) makes a colorful addition to any room. When lined with cedar it affords desirable storage for woolens, as well as for the traditional bridal linens.

To obtain a templet for the arched construction of the front and side panels illustrated in Figure 2.73, two marks are made on one of the upper side rails, 3½ in. in from both ends on the lower, horizontal edge. A curve with a 6½-in. radius is marked off between these marks and cut out with a compass or band saw. The rail can then be used to mark off identical arcs on the other rails. The top rail for the back can be left straight.

A ¼-in. groove ⅜ in. deep is cut in each arc, with the aid of a drill press, or hand-chiseled. The same-sized groove is routed in one edge of each stile and bottom rail, and on both long edges of the two center stiles, front and back.

Haunched tenons are cut in the top of each stile and on each end of all bottom

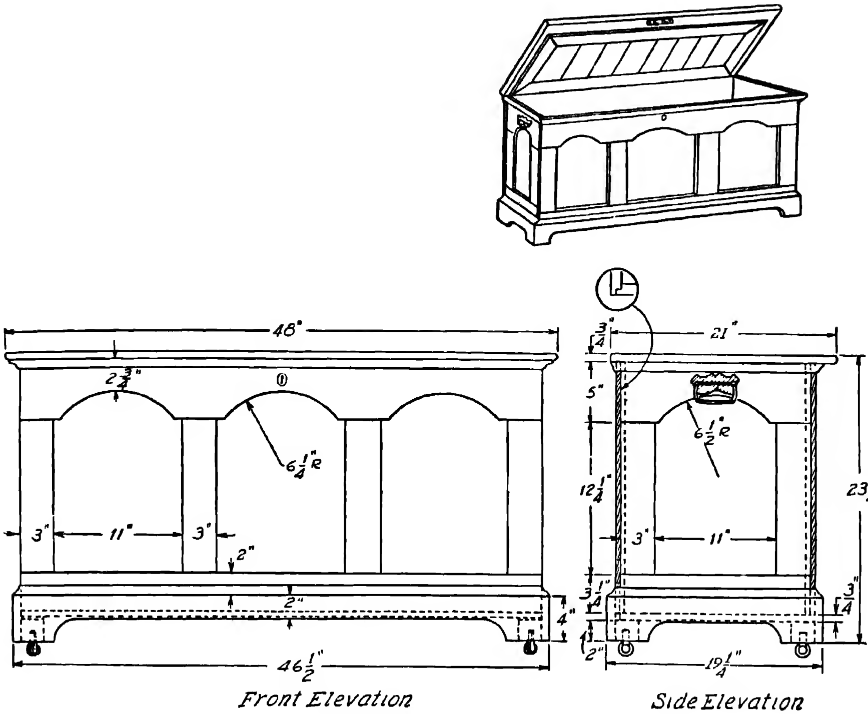


FIG. 2 73. Pennsylvania German dower chest.

rails. The corresponding members are mortised to form stuck panel frames. After the plywood panels are tried for fit, the mortise and tenon joints are glued and clamped. No glue is applied to the plywood. At the same time the top can be doweled and glued.

When the glue is dry, the corners of the four panels are rabbeted as shown in the detail, Figure 2.73. They are then glued and screwed at side and rear corners, with diagonal braces to insure true squaring. Since the contemplated finish involves the peasant painting described in Chapter 5, flathead screws can be used, countersunk, and puttied.

The base has mitered corners with a simple cutout at the lower edge, whose rounded corners commence 3¾ in. in from both ends to form "legs." After being checked for a tight fit around the lower 2¾ in. of the chest, the base is glued together with four 2 in. × 2 in. blocks screwed to each corner from the inside. Each block is bored to take a caster.

When the corners of the chest have dried, the bottom is butted to the frame and screwed on, after which operation the chest is inserted in the base, where it will rest on the four corner blocks. It can be fastened firmly to the base by screws, countersunk lightly from the inside. The cove moldings are mitered and

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	10½	48	Lid (21 in. wide)
8	¾	3	13¼	Front and back stiles
2	¾	5	45	Front and back top rails
6	¾	3¼	13	Front and back bottom rails
5	¼	11¾	15¼	Front and side panels (plywood)
3	¼	11¾	17¼	Back panels (plywood)
4	¾	3	13¼	Side stiles
2	¾	5	17¼	Side top rails
2	¾	3¼	17¼	Side bottom rails
9–15	¾	Random	17¾	Bottom
2	¾	4	46½	Base, front and back
2	¾	4	19	Base, sides
4	2	2	2	Blocks for casters
4	11/16	13/16	93	Cove trim, front and back
4	11/16	13/16	38½	Cove trim, sides

attached to the upper edges of the chest and the base with countersunk finishing nails.

Cedar lining comes tongue and grooved in ¼-in. strips approximately 3¼ in. wide. Cedar plywood makes an excellent but more expensive lining. The bottom is laid first, then each course, tongues up, is carried around the sides and ends, and butt-jointed. The corners of the chest should be adequately braced from outside to withstand hammer blows from within. The top course is fitted so that it extends to within ¼ in. of the top of the chest, when tongues are ripped off and it is sanded smooth.

To insure the proper overhang, two cabinet hinges are screwed to the underside of the lid and caught with a minimum of short screws on the top of the chest's back edge. When the chest is upended, a pencil line can be run accurately around the outside edge of the chest, on the underside of the lid. Another line drawn parallel to and ¾ in. inside the first outline will mark the outer edge of the cedar lining for the lid. A third line 1 in. outside the first outline marks an equal overhang for the lid.

The lid is then removed and its excess overhang cut off with rounded corners; the edges are beveled round and sanded. Next a mitered course of cedar lining with its tongueless edges facing outward is bradded to the lid along the inside edge of the inner pencil line. The interior of this mitered frame is filled with parallel strips to complete the lining of the lid.

A lock is recessed in the front edge and its keyhole framed with a suitable wrought-iron escutcheon plate, if desired. The hinges are screwed back on with longer screws and a chain fastened to hold the lid open. Appropriate wrought-iron handles may be added. All edges and corners are beveled and thoroughly sanded to represent the roundness of age.

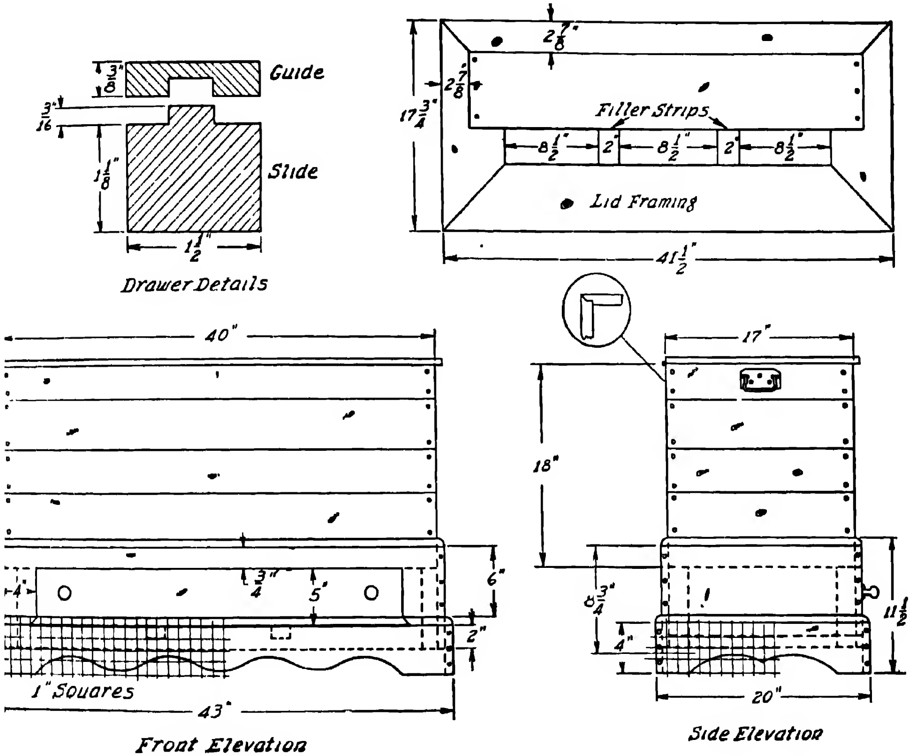


FIG. 2.74. Colonial knotty pine cedar chest.

Colonial Knotty Pine Cedar Chest. Several methods may be employed to construct a simple pine storage chest. In the one described below (Figure 2.74), random widths of knotty pine, either plain or V-grooved, or tongue and groove stock left over from a paneling job, are fastened with exposed dowel "pegs" to carry out the Colonial feeling. Pieces with the most knots and the handsomest grain are naturally chosen for the front, lid, and ends.

To conceal the corner joints the ends of each side- and endpiece of the chest shown in Figure 2.72 are cut with rabbet miter joints. In ¾-in. stock this is accomplished by cutting ⅜-in. rabbets ¾ in. deep, then mitering the protruding ledge, which automatically reduces it to a length of ⅜ in., or half the thickness of the board.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	6	41½	Sides, lid framing
2	¾	6	17¾	Ends, lid framing
2	¾	2	5¾	Filler strips
2	¾	6	35¾	Top panel, lid
8	¾	Random	40	Front and back, chest (18 in. wide)
8	¾	Random	17	Ends, chest (18 in. high)
3-4	¾	Random	40	Bottom, chest
2	¾	8¾	41½	Front and back, subbase
2	¾	8¾	18½	Ends, subbase
2	¾	4	7¾	Corner blocks, subbase (4)
1	¾	4	43	Front and back, base
2	¾	4	20	Sides, base
1	¾	5	33½	Drawer front
2	½	4½	16½	Drawer sides (over-all)
1	½	4	33	Drawer back
1	3/16	16½	33	Drawer bottom, plywood
2	1⅛	1½	18½	Drawer slides
4	⅜	1½	15¼	Drawer guides
2	¾	¾	83	Molding, subbase, front and back
2	¾	¾	37	Molding, subbase, ends
2	¾	¾	86	Molding, base, front, and back
2	¾	¾	40	Molding, base ends

When all miters are cut and checked for fit, holes are drilled along the front and back sides of the corners to take No. 7 F.H. screws, countersunk ¼ in. and plugged, after glue has been applied to each rabbet. If preferred, the corners can be fastened with dowels. The bottom members of the chest's sides and ends are also rabbeted and mitered into the bottom boards to preserve a finished appearance, if it is ever decided to use the chest without its base. The bottom screws need not be plugged.

To make the base the four outside corners are mitered. The drawer opening is sawed out of the front of the subbase, leaving a 1¾-in. rail at the top. The subbase can then be tried for easy fit around the bottom of the chest before it is glued and fastened together with plugged screws. When the glue is dry, corner braces are cut into mitered halves and screwed in 1⅝ in. down from the top edges.

The front and sides of the base can be cut out in a simple series of flowing curves typical of Colonial craftsmanship. (One such design is illustrated in Figure

2.74.) After the subbase has been glued and fastened together with plugged screws at its corners, the base is screwed to the subbase from the inside, so that the latter extends 2 in. into the base.

The construction of the drawer follows the conventional lines for center-slide drawers, with emphasis on strong joints to bear the weight of heavy linens. The dovetailed drawer described in a previous section devoted to drawer construction will admirably fill the bill.

Two 1⅛ in. × 1½ in. center slides are lapped, doweled, or lap-dovetailed into the lower rail. Two smoothly sanded guides ⅜ in. × 1½ in. are lap-dovetailed into the bottom of the drawer's front- and backpieces for each slide. They are later glued in place along the drawer bottom with a few short brads inserted from inside. The lower extension of the back of the drawer is cut out to receive the slides, 1/16-in. projections being left in the center of the slot to ride over the slides.

Quarter-round moldings are mitered around the top of the chest, the upper edge of the base, and its subbase. The piece of molding along the front edge of the base is cut the width of the drawer, to which it is attached by finishing nails, countersunk, and puttied.

The lid is constructed of a mitered frame of 6-in. boards, covered by a glued-up panel of two shorter 6-in. boards, lapped back 2⅞ in. all around, and screwed to the frame from the underside. Two filler strips are screwed 8½ in. apart across the width of the recessed panel to hold the cedar lining to the underside of the lid.

The interior of the chest is lined in the same manner as already described for the Pennsylvania Dutch dower chest. The lid is attached with a piano hinge, and a center break lid stay is installed. In this type of chest the keyhole can be left without an escutcheon plate.

Pine Woodbox. By reducing the dimensions and simplifying the base of the Colonial pine chest described in the preceding pages, a sturdy matching container for firewood can be easily constructed (Figure 2.75).

Suitable dimensions will provide a chest 36 in. long and 19 in. wide with a total height of 17 in. Since there is to be no drawer, the subbase is eliminated and the base proper constructed of separate legs and filler strips as will be noted in Figure 2.75.

For added strength, as well as for experience, lock miter joints can be more easily constructed with hand or power tools in the narrow widths of siding used to build up a chest of this style. If a simpler joint is used it can be strengthened by corner braces that have been ripped lengthwise into triangular strips (*B*). If heavy logs are used for firewood, it will be better to raise the bottom and reinforce it by strips screwed underneath to the edges of the chest (*C*).

In place of hinges the combination hinge and lid stay pictured in detail A can be installed. The fabrication of the seat cushion will be described later in Chapter 7. If the box is to be used as a window seat, its height will, of course, be determined by the distance the window is set above the floor.

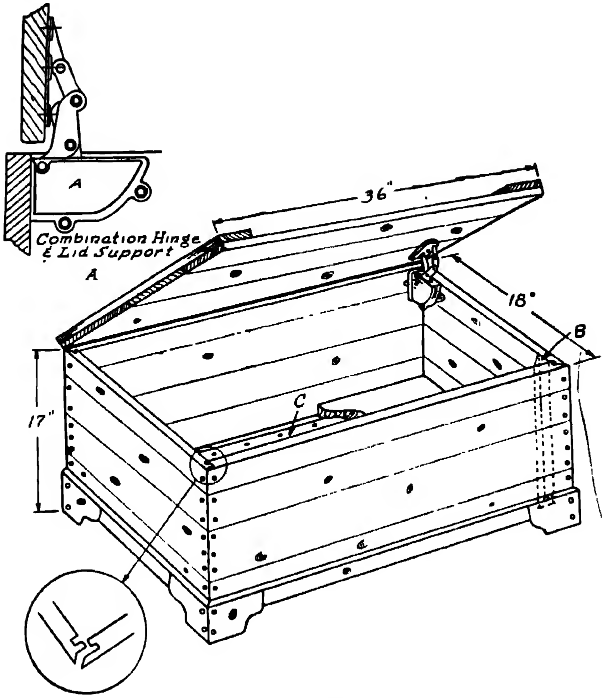


FIG. 2.75. Pine woodbox.

KITCHEN CONVENIENCES

The culinary department of the modern home has made noteworthy advances during recent years as the result of scientific planning. Not the least important factor in this "wife-saving" campaign has been the development of well-proportioned cabinets for the compact and convenient storage of utensils and dishes

Kitchen Cabinet. The one-piece job (Figure 2.76) described below can be easily altered to suit circumstances. It provides a working surface of 24 in. × 36 in. with a 16-in. clearance at the rear for tall articles such as electric mixers. A plywood counter is specified on the assumption that it will be covered by linoleum, or other suitable material.

Before the sides (*A*) and (*B*) of the cabinet are glued, a ¼-in. rabbet ½ in. wide is cut along the inner sides of the back edges to take the ¼-in. plywood back. After the sides are glued, instead of using clamps, the base cleats (*E*) can be screwed 3 in. back from the fronts of the bottom edges, and the drawer guides (*P*) fastened in place, including the three on the right side. Cleats (*R*) can also be lined up and screwed into place at this time, ready to hold the rear of the counter's sides. Blind dadoes are cut 10 in. apart in the upper sides for the bottom (*G*) and the shelf of the upper cabinet, (*T*).

Lumber List

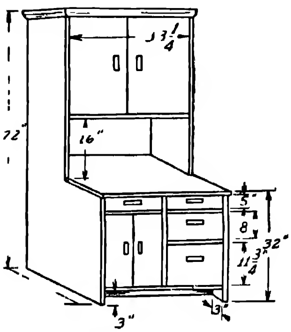
Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
(A) 2	⅞	12	72	Sides
(B) 2	⅞	11½	31¼	Sides, lower cabinet (front)
(C) 1	¼	34¼	70	Back (plywood)

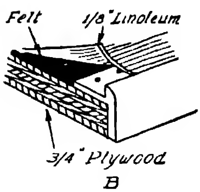
Lower Cabinet

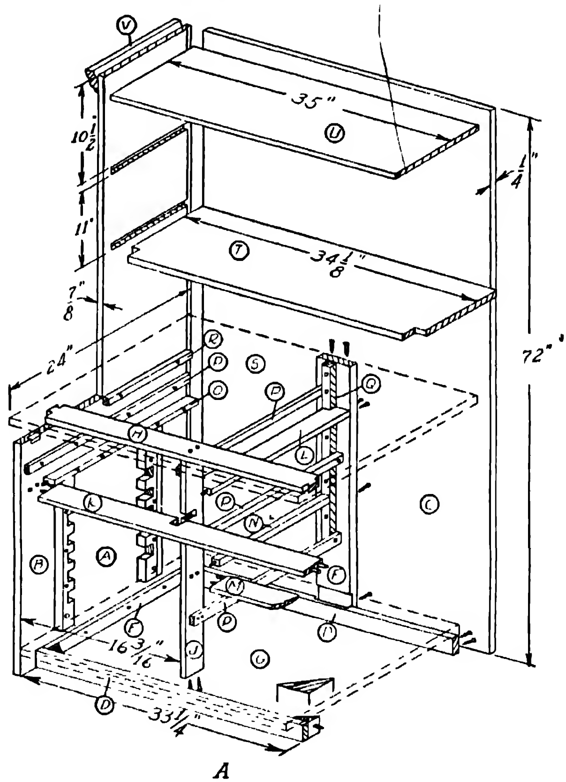
Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
(D) 2	¾	3	33¼	Base, front and back
(E) 2	¾	3	18¾	Base, side cleats
(F) 1	¾	3	31¼	Upright, rear
(G) 2	⅞	11⅝	33¼	Bottom
(H) 1	⅞	3	34¼	Top rail
(J) 1	⅞	3	26½	Divider
(K) 1	⅞	3	33¼	Drawer rail (double)
(L) 1	⅞	3	19½	Drawer slide (double)
(M) 1	⅞	3	16⅜	Drawer rail
(N) 1	⅞	1½	19½	Drawer slide
(O) 3	⅞	1½	20¼	Drawer slides
(P) 8	⅜	⅞	21¼	Drawer guides
(Q) 3	⅞	⅞	5-8⅝-12	Cleats, drawer guides
(R) 2	⅞	⅞	11¾	Cleats, counter
(S) 1	¾	24	36	Counter top
2	¾	8	26½	Doors (plywood)
2	⅞	5	16 3/16	Drawer fronts
4	½	5	22	Drawer sides
2	½	4½	14 15/16	Drawer backs
1	⅞	8	16 3/16	Drawer front
2	½	8	22	Drawer sides
1	½	7⅜	14 15/16	Drawer back
1	⅞	11¾	16 3/16	Drawer front
2	½	11¾	22	Drawer sides
1	½	11	14 15/16	Drawer back
4	¼	14 15/16	22	Drawer bottoms
16	⅜	⅞	21	Drawer guides
1	¾	22½	16 3/16	Shelf

Upper Cabinet

Pieces		*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
(*T*)	2	7/8	11 3/4	34 1/4	Bottom
(*U*)	1	7/8	11 3/4	35	Top
(*V*)	3	1 3/8	1 3/8	66	Cove molding
	2	3/4	16 5/8	20 3/4	Doors (plywood)
	1	3/4	11	34 1/4	Shelf







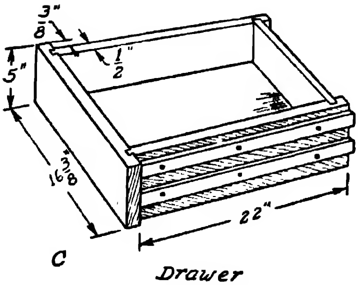


FIG. 2.76. Kitchen cabinet.

As shown in Figure 2.76, the rear upright (*F*) is half-lapped into the rear center of the base. This will require a corresponding mortise in the back of the bottom (*G*), before it can be fastened in place after the base is assembled.

Dovetails can now be cut at the ends of the top rail (*H*), and the divider (*J*) double-notched 5 in. down from the top into the center of drawer rail (*K*). Double dowels are glued into both ends of drawer rails (*K*) and (*M*), and into the front ends only of drawer slides (*L*), (*N*), and (*O*), including the two on the right of a size identical with (*O*).

The double slide (*L*) can now be butt-jointed 5 in. below the top of the upright (*H*). Holes are drilled in the inner edge of the double slide (*K*) for the reception of the dowels in the front end of double drawer slide (*L*) astride the center notch in (*K*).

The assembly can now be commenced by fastening together the base. Nails or screws attach the rear of the base to its inner cleats (*E*), already in place, and corner blocks hold the front (*D*) firmly to the cleats at the front. The bottom can now be slipped into place and fastened to the top edges of the base.

The doweled ends of drawer rail (*M*) are fitted into corresponding holes drilled 12 in. above the bottom, and the dowels of drawer rail (*K*) into holes 5 in. below the top rail (*H*), before the sockets for the dovetails of the latter are marked and chiseled out on the top edges of the lower cabinet sides.

After the rail has been fitted into its sockets the divider (*J*) is notched into place and butt-jointed to the center of top rail (*H*). Its lower end is nailed or screwed to the bottom from underneath. The lower drawer slide (*N*) is doweled into place 12 in. above the bottom of the cabinet, before the double drawer slide (*L*) is fitted in place astride the center notches. It is best to insert the drawer guide cleats (*Q*) at this time, before the back and counter are in place. The remaining drawer guides (*P*) can also be fastened in place on both sides of the cabinet and of the divider and the drawer guide cleats.

The counter is nailed or screwed in place and the bottom (*T*) and shelf of the upper cabinet slid into place. The top is butt jointed to the sides 1⅝ in. down from the top edges. A suitable 1⅝-in. cove molding is mitered around the top. A ¼-in. plywood dust cap glued flush with the top edges of the molding is optional.

With ¾-in. plywood doors it is often possible to use butt hinges whose screws will penetrate the core for a firm hold. Otherwise the hinges must be fastened across the front of the doors and the cabinet edges.

Since the drawer guides are ⅜ in. thick, the sides of the drawers must be set into the fronts by that amount. As shown in the plan of a drawer, dovetailed front ends of the slides can be slid into mortises in the fronts, with the backs rabbeted into the rear ends. Grooves are cut in the front and sides for the plywood bottoms.

After the drawers are fitted into their openings the drawer guides are marked,

and pairs of guides fastened to the sides of the drawers to ride on the guides in the cabinet to help distribute the weight.

For handles, 1⅞ in. × 1⅞ in. pieces up to 11 in. long can be rounded at the ends on one side and its corners. A groove is routed out underneath, and on top, as well, if desired, and the flat surface is fastened to the drawer and door fronts by screws from inside.

To make the shelf or shelves in the lower cabinet adjustable, two 2 in. × ¾ in. strips are attached to each side of the cupboard space as shown in the lower cabinet, with ¾-in. mortises spaced about 1½ in. apart. The strips on the right side can be attached to the divider (*J*) and the edge of the upright (*F*), with the shelf notched to fit.

Such a cabinet can of course be constructed tall enough to fit flush with the ceiling, if desired. The modern trend, however, is to use separate cabinets, the upper one being attached to the wall studs with a bulkhead of wallboard built on top of and flush with the upper cabinet to take up the space to the ceiling, which is too high to reach without a stepladder.

In the case of separate cabinets, a lighter, plywood panel construction of square stuck frames can be used in the lower cabinet. Various widths can be built to form continuous counters and extend around corners. Where several base cabinets are used in this manner, various refinements can be built in to meet the requirements of the individual housewife. These include a shallow, sliding half drawer on cleats in one of the upper drawers, to accommodate silver; tall, narrow cupboards or drawers for trays; shallow racks along doors for spices; mixing boards that slide out; metal-lined flour bins with sifters; racks permitting dishes to be set on edges; pot-cover compartments in drawers, or racks on door backs; tubular lights under upper cabinet bottoms, and as many other conveniences as the ingenuity of the builder can produce.

For cementing a linoleum cover to the counter of the lower cabinet, chromium or plastic flush-type trim is procurable that has been fabricated for just this purpose. Screwed to the top edges of the counter, their thickness is compensated for by a layer of felt cemented between the pieces of trim before the linoleum is cemented in place, as shown in detail B.

Heavy-Duty Kitchen Table. For the small home where the kitchen table offers the only workbench surface available to the home craftsman, a ruggedly constructed table (Figure 2.77) offers a solution to the work problems of the masculine side of the family. Its obvious sturdiness may bring some gleam of approval to the critical scrutiny of the doubtful housewife, who may be appeased for lack of drawer space by the fact that the table is easy to take apart and store away, since only the top is screwed.

The dimensions used should fit the available space in width and length, and the height should be measured to suit the housewife. The thickness of all the members can be up to 2 in.; the dimensions listed are only guides.

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
5	¾	5	40	Top (25 in. wide)
4	1⅛	5	30	Legs
2	1⅛	5	37½	Front aprons
2	1⅛	5	20¼	Side aprons

All four legs are tapered on two sides to 3 in., and a 5-in. half lap 9/16 in. deep is cut in their opposite, upper, ends to receive the front aprons.

Each front apron is mortised ¾ in. from its end to receive the end of a side apron to a depth of 9/16 in. The joints are assembled without glue or screws by ¼-in. rods being inserted through the legs inside the side aprons as in Figure 2.77. Both ends of the rods are threaded for nuts bearing on washers.

Metal mortise fasteners can be screwed to the tops of each apron for fastening on the glued-up table top, which can be smoothly surfaced by gluing on a pressed-wood top layer, or heavy linoleum bound by chrome edging around the table's edge.

To protect the top during workshop hours a secondary plywood top can be cut and equipped with a 2- or 3-in. overhanging frame that fits snugly down over the edges of the table top.

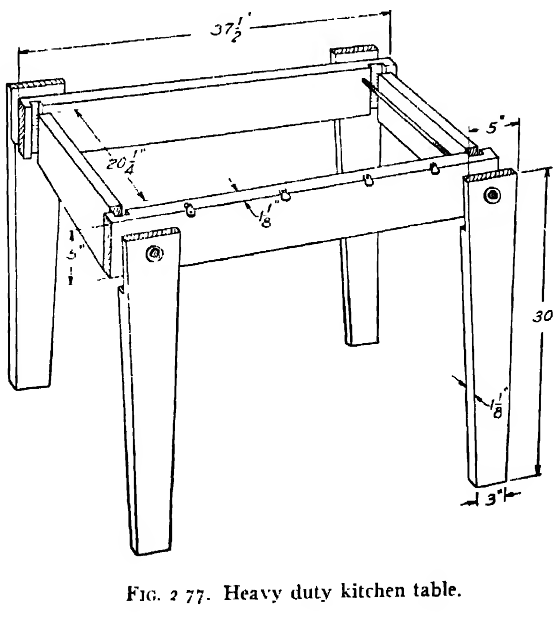


Fig. 2 77. Heavy duty kitchen table.

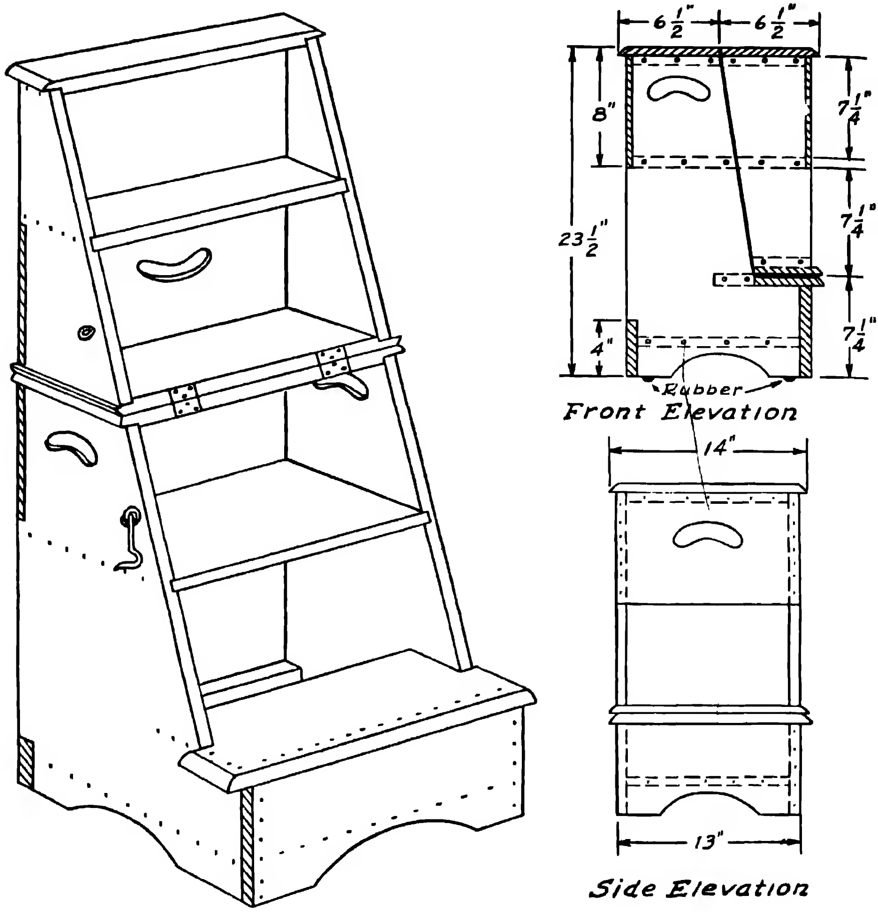


FIG. 2.78. Combination stool.

Combination Stool. A handy kitchen stool that opens up to form a short stepladder for reaching articles stored away on top shelves and high compartments is illustrated in Figure 2.78. When closed, the stool is 24 in. high, has a top 14 in. square, and a shallow compartment in the base for cleaning materials, dust cloths or shoe-shining equipment. Open, the ladder consists of four steps (not including the top), on 7¼-in. risers.

If 14-in. boards are not available, the sides must be glued together and set aside to dry. Meanwhile the tops of both sections, including the top step, can be rabbeted ¾ in. deep to house the sides, with an allowance for a ½-in. overhang on all but the hinge edges. The bottom step must be cut out so that its rear edges can either be fitted into a stopped dado for a distance of 3 in., or rested on cleats 6½ in. long, as preferred.

Lumber List

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
2	¾	13¾	23½	Sides
1	¾	12½	12½	Bottom
1	¾	6½	14	Front riser
1	¾	4	14	Back strip
1	¾	7¾	15	Bottom step
2	¾	5 & 8	13¼	Middle steps
2	1¼	6½	15	Stool top
1	1¼	4½	15	Top step
2	¼	8	14	Front and back aprons (plywood)

Before the two sides are ripped diagonally as indicated in the side elevation of the drawing, the grooves for the middle treads should be sawed or chiseled out to allow for 7¼-in. rises, so that they will coincide after the two sections have been cut apart. Notches ¾ in. deep are cut in the rear of both sections for the back strip, ¾ in. is cut off the front step, and the plywood aprons are inset ¼ in. Last of all, hand holes are bored out in the sides of the lower section and in the front apron, and circular openings cut in the bottoms of the sidepieces and in the front riser.

The assembly is accomplished one side at a time, with the bottom butt-jointed and screwed into place. Countersunk and plugged or puttied screws are used to reinforce the dadoes from the outside, and the aprons are screwed or bradded into place flush along the edges of the sides and steps for additional security. The top of the stool is butt-hinged in its center, and the rear edge of the top half of the upper section beveled to allow it to move upward smoothly. Hooks and eyes are provided at the sides to keep the sections together when closed.

Utensil Rack. For the kitchen with ample wall space, particularly if finished in knotty pine or cottage style, the rack illustrated in Figure 2.79 is both picturesque and utilitarian. It consists of half a small wagon wheel, including the hub, screwed from the rear to a flat piece of wood, which is hung or attached to the wall. The iron rim has been removed, and hooks attached around the circumference from which to hang various kitchen utensils. A genuine wheel can be sanded and waxed or shellacked.

If a wagon wheel is not available, a decorative facsimile can be band-sawed out of scrap lumber. The rim can be lap-jointed, as shown in detail A, with 1-in. dowels or small curtain rods spokeshaved into spokes radiating from a whittled or turned imitation hub. Painting such a built-up wheel the color of the wall often gives it an appearance of authenticity.

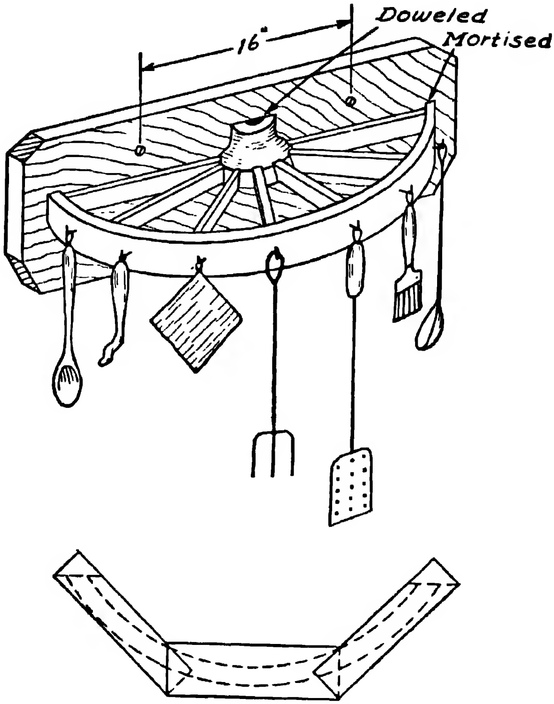


FIG. 2.79. Utensil rack.

BATHROOM ACCESSORIES

Gracious living includes the unhurried enjoyment of satisfactory bathing facilities. When the original plumbing plan becomes overtaxed by increased family participation, every effort should be made to increase the facilities adequately.

Shelf Rack. Few bathrooms provide sufficient towel racks for individual towels and washcloths, or adequate shelf space for the ever-increasing collection of toilette aids. Seldom is floor space available for the type of standing rack pictured in A of Figure 2.80. However, there is usually sufficient wall space for the combination shelf and rack (B, Figure 2.80) described below. Its length can be doubled or tripled, or several units may be located at different points. Finished to match the walls it is inconspicuously useful.

The uprights are curved at both ends as shown in B and ¾-in. holes bored halfway through the inner sides to receive the dowel, plastic, Bakelite, or chromium rod. Half laps are cut in both shelf and uprights so that the latter will be on 16-in. centers. Holes are bored at the necessary angles so that both ends of the uprights can be screwed through the wall surface to the studs. If preferred, the

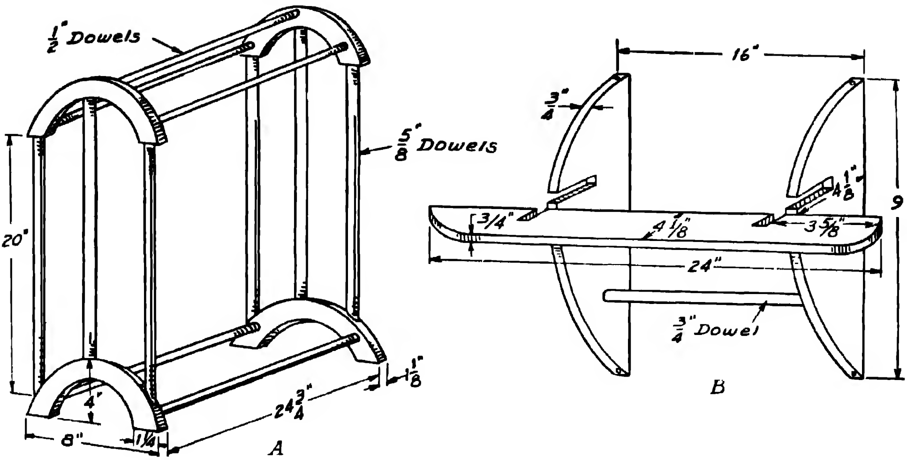


FIG. 2.80. Bathroom racks.

uprights can be lengthened to 6 in. to accommodate a second, lower shelf above the towel rack rod.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	¾	4⅛	24	Shelf
2	¾	4⅛	9	Uprights
1	¾		16	Dowel

Vanity. Where space permits a small vanity (Figure 2.81) in a bathroom is not only a luxurious postbathing adjunct, but a boon to crowded bedrooms. With a gayly ruffled skirt to conceal it, the frame may be knocked together from inexpensive scraps of lumber.

Since it is not intended to store cosmetics in this tiny dressing table, no drawers or shelf space is provided. If added, they will be accessible when the pivoted arms of the top underframe are swung open. A small stool can be stored behind the skirt when not in use.

Because of the concealing skirt the construction details may be greatly simplified. The front and back rails are lapped and nailed into the sidepieces, centrally separated by the divider, which is butt-jointed and nailed as shown in Figure 2.81. "Ears" to support a dowel pivot are fastened to the ends of the front rail by means of angle irons.

LUMBER LIST

Pieces		Thickness, in inches	Width, in inches	Length, in inches	Description
(C)	1	½	15	34	Top
	2	¾	12	28¾	Sides
	2	¾	1¾	24	Front and back aprons
	1	¾	1¾	10½	Divider
	1	¼	24	28¾	Back (plywood)
(D)	1	¾	2	24	Top frame, back strip
(E)	1	¾	2	10	Top frame, divider strip
(F)	1	¾	5½	11	Top frame, sides
(G)	2	¾	5	16	Swinging skirt arms
	2	1⅛	2	3½	Pivot ears

The top and top frame, including the pivoted skirt arms, are cut according to the pattern in detail B, and the frame is nailed or screwed to the top edges of the rear apron, divider, and sides, as indicated by the dotted lines. The arms are pivoted with ⅜-in. dowels, and the kidney-shaped top screwed in place from underneath.

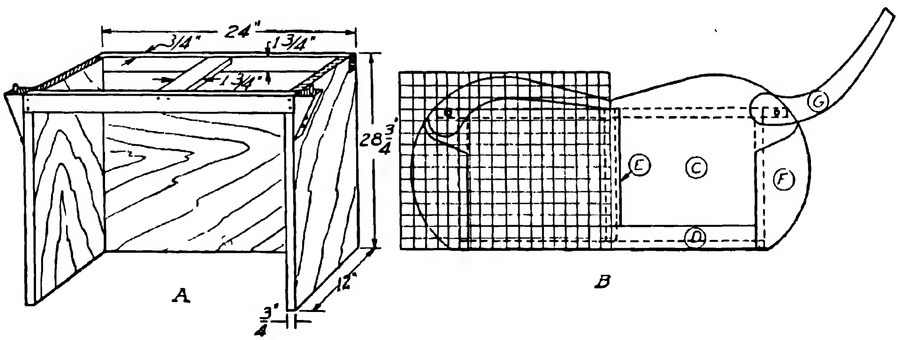


FIG. 2.81.

The skirt can be tacked to the ¾-in. underframing of the top, using a suitable binding material to cover the tack heads. If a piece of plate glass can be cut to fit the top, a piece of the skirt material may be stretched tightly beneath it to cover the plywood or prestwood top.

Laundry Hamper. The floor space required for the clothes hamper so frequently located in the bathroom can be salvaged to a maximum degree by building a hamper into a low cabinet, with drawer space and a table-height top (Figure 2.82).

LUMBER LIST

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
2	¾	7	24	Top (14 in. wide)
4	¾	1½	30¾	Stiles, sides
2	¾	1½	12¼	Top side rails
2	¾	3	12¼	Bottom side rails
2	¾	1½	22	Top front and back rails
2	¾	1¼	22	Front and back drawer rails
2	¾	1	22	Front and back base rails
2	¾	1¼	10¼	Side drawer rails
1	¾	¾	11¾	Drawer guide
2	¾	3	21	Door stiles
2	¾	3	16	Door rails
1	¼	23	26¾	Back (plywood)
2	¼	11¾	26¾	Side panels (plywood)
1	¼	14½	14¼	Door panel (plywood)
2	⅜	11¾	21	Sides, hamper
1	⅜	19⅝	21	Back, hamper
1	⅜	11¾	19⅝	Bottom, hamper
1	¾	4½	20	Drawer front
2	½	4½	11¾	Drawer sides
1	½	4½	19½	Drawer back
1	¼	11¼	19½	Drawer bottom (plywood)

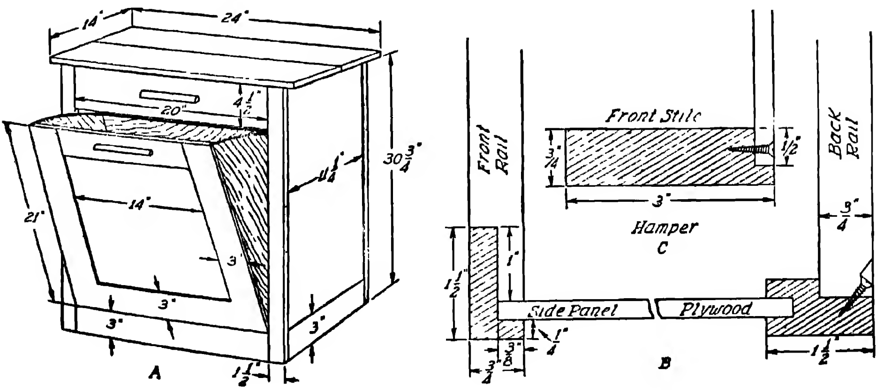


FIG. 2.82. Laundry hamper.

Since the carcass of this chest will be subjected to very little strain, and the finish will be either paint, lacquer, or enamel, the economical panel or "stuck frame" type of construction is employed. Two identical panel frames are made up for the sides with mortise and tenon joints and a ¼-in. groove worked along the inside edges of the frames on the shaper with straight cutters, the circular saw with dado head, or hand-tooled, to receive the plywood panels. After the frames have been glued and are dry, rabbets, see (*B*) are cut for the top and bottom front and back rails, and holes bored for doweling the drawer frame into place. The latter is made up in the usual manner with a center drawer guide lapped into the back.

One side panel at a time is glued to the front and back members. The rear inner edges of the two rear stiles and the top edge of the two rear stiles and the top edge of the bottom back rail can be rabbeted to take the plywood back, unless it is desired to groove the latter as a panel into the back members.

The door is constructed in the same manner as the side panels and the hamper assembled like a large drawer with both sides let into the front, and the back slipped into grooves in the rear ends of the sides. As illustrated in Figure 2.82, the sides slope toward the back to permit tilting the hamper forward. The drawer is of standard construction with a dado cut in the bottom of the back to ride over the drawer guide.

Corner blocks are screwed to the rear corners to act as bumpers for the hamper when closed. Butt hinges are gained into the bottom of the door and appropriate drawer pulls screwed from the inside. The top of the chest can be covered with plate glass, Micarta, formica, or enamel.

Bathroom Stool. Not only more comfortable but considerably safer than the edge of the bathtub, the average bathroom stool is furnished with a wooden top, enameled to shed moisture. With the advances made in waterproof vynol-plastics such as Koroseal sheeting, however, there is no reason why the lowly stool cannot acquire the comforts of simple upholstery over the resilience of a modern fitting of Latex sponge rubber, particularly when it doubles as a vanity or dressing-table seat.

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4	1¾	1¾	18	Legs
4	¾	2½	12	Rails
4	¾	1	15½	Stretchers
4	¾	¾	10	Seat cleats
1	¾	12	12	Seat bottom

The legs are tapered to 1¼ in. by sawing along the two inner surfaces only. As will be noted in Figure 2.83, the upper ends are notched to receive the rails, which are cut so that the legs slant out at about 5° in both directions. The stretchers are tenoned into place 5 in. from the bottom; the tenons must be cut to allow for the slanting of the legs. Cleats are screwed to the lower edges of the rails to support the ¾-in. plywood seat, which can be cut to fit from a cardboard template, after the rails are glued and screwed into place, and the stretchers inserted. Ventilation in the seat is provided by a dozen or so ⅜-in. holes, bored through the plywood. The upholstery of the seat cushion is described in Chapter 7

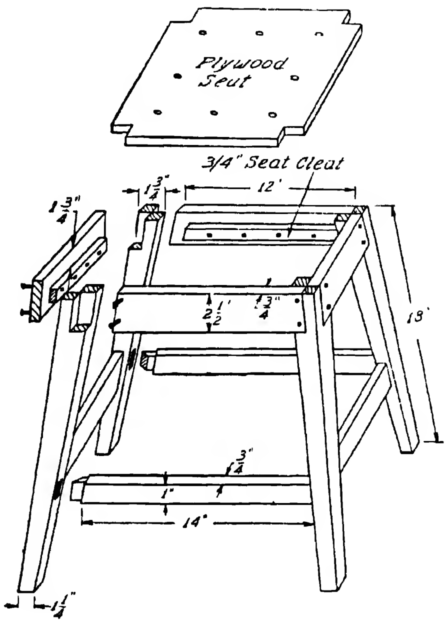


FIG. 2.83. Bathroom stool.

By lengthening the legs to 28 in., tapering them to ⅞ in. at the ends, and inserting the stretchers about 9 in. from the floor, the little stool can be raised to kitchen or bar height with no other changes in its dimensions.

LAMPS

Table lamps are being effectively fashioned from every conceivable kind of material in a profusion of highly imaginative forms. In addition to the traditional porcelain, glass, marble, and metal lamps, plastics, leather, bamboo, and curiously turned wood bases are available in a variety of graceful modelings.

In addition, an amusing vogue suitable for Early American rooms has grown

up in the evolution of lamps as "conversation pieces." These take the form of compositions glued or otherwise attached to rough pine, oak, or maple bases, consisting of vocational and avocational groupings of old-fashioned articles, such as a reaper's iron tool head, including hone and perhaps a glove; a leaning horseshoe surrounded by a selection of ancient farrier's tools; a wheelwright's jack and wagon-wheel hub with one spoke remaining as the lamp support; an open Colonial almanac with square spectacles and case open on the pages as if momentarily laid down by the reader; a pair of early infant's shoes and simple toys scattered at random; old-fashioned carpenter's wooden tools, inkwells with quill pens and faded, handwritten letters, and many other interestingly colloquial arrangements. In this class, too, are lamp fixtures sprouting from old coffee mills, condiment cannisters, spice boxes, foot warmers, stone jugs, churns, decoy ducks, and children's toys.

Jugs and Bottles. It is obvious, therefore, that the construction or assembly of modern electric lamps is limited only by the ingenuity of the home mechanic. If concealment of the cord from the lamp socket is not considered important, single and double socket assemblies are available from electrical and hardware suppliers that can be fitted into the necks of artistically shaped bottles, jugs, vases, earthenware pots, artillery shells, and the like. Large glass acid carboys or pleasingly shaped jars or fishbowls can be filled with water tinted to harmonize with a room's color scheme, or to complement a favorite pillow or wall hanging, to make colorful lamp bases. A pair of chemist's flasks on a dressing table can contain water whose hue reflects the table's ruffled skirt or the bedspread's pastel colors. Wooden plugs can be whittled or turned to fit the mouth of the receptacle, and an electric fixture fitted to them as explained above.

A Variety of Bases from Available Materials. For formal as well as informal rooms there are many materials in common use that can be easily assembled into attractive lamp bases. One inveterate shopper of our acquaintance selects well-grained, round bread boards and rolling pins at the local five-cents-and-up store, sandpapers them smooth at home, removes the rolling pin handles, and burns out a through channel with a hot poker after drilling as far as possible from both ends. An electric socket and nipple is held in place by plastic wood in the top hole with its cord running through the rolling pin and out the side, just above the bread board base, which is screwed to the opposite end from the underside atop an inverted ashtray (A of Figure 2.84). This type of lamp lends itself to a modern limed or off-white finish.

For nautical rumpus rooms the above lamp, or one with a larger wooden or cardboard cylinder (capped by wood disks), wrapped with a single spiral of small rope, will blend well with the salty motif.

Three twisted wood drapery rods screwed or doweled to round or octagonal bases and tops (detail B) when painted, make an interesting table lamp. Such a lamp will be particularly effective if used on the corner lamp table described in

the section devoted to plywood projects (page 56), when the latter is assembled with the same style of drapery rods, instead of smooth dowel legs.

Bundles of bamboo sections of equal lengths bound together near their upper ends and in the middle by seven or eight spiral turns of light brass wire can likewise be capped by walnut tops and bottom disks to form attractive living room lamps as in C. Bamboo may be simulated by grooving 1-in. dowels to imitate

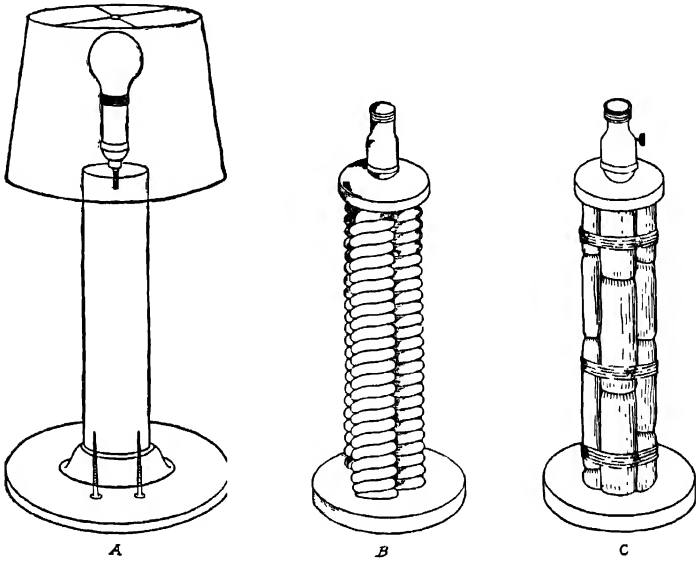


FIG. 2.84. Table lamps

joints, and spokeshaving the central parts of the intervening spaces. Raw sienna with a fleck of burnt umber, well diluted by turpentine and linseed oil, is rubbed on lightly with a soft cloth and highlighted by wiping off most of the mixture from the spokeshaved central sections. The grooves are darkened with burnt umber.

Height. Table lamp bases vary in height from 6 in. boudoir lamps to 16-in. library fixtures. In general, an average height of from 8 to 11 in., when placed on a table 30 in. high will prove most acceptable for reading.

Hardware. Where the electric cord is to be concealed in its "run" from the socket out of the base to the plug, threaded tubing is commercially available with nuts at both ends, as pictured in A of Figure 2.85. In a majority of lamps only a threaded, ⅛-in. nipple is let in or "sunk," like a dowel, into the top of the lamp. The bottom section of the electric socket screws onto the top of the nipple. When concealment of the electric cord is not considered important, it may be led out through a fiber bushing set in a hole that can be drilled in the side of the shell, as in detail B. Detail C indicates a fixture that will raise the height of a low lamp base.

Various devices can be procured for attaching the shade to the lamp, varying from a simple spring clasp in the lampshade that grips the top of the electric bulb to harps that bend out around the bulb from the socket, and rods with screw-cap

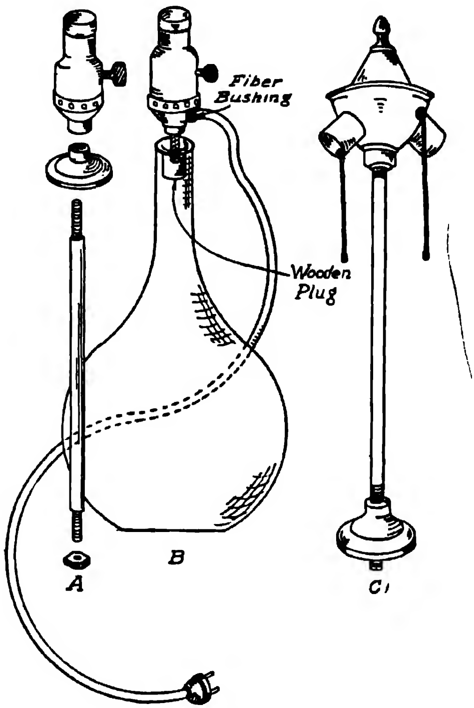


FIG. 2.85. Lamp socket assemblies.

finials and adapters threaded over the nipple, which may in turn enclose inverted glass globes upon whose upper edge the lampshades' wire frames are crimped. Care should be exercised that the shade is in proportion to the height and width of the lamp base.

Nailbox Table Lamp. Harmonizing with the Cobbler's workbench and other Early American or Colonial furniture, a table lamp fabricated as a replica of a small nailbox (Figure 2.86) is not only one of the simplest of woodworking projects to assemble, but also a most useful accessory, whose small compartments are ideal for holding cigarettes, pipes, ashtrays, decks of cards, or potted ivy.

Although the nailbox base can be, and probably was, "knocked together" with butt joints, it also offered its maker an excellent opportunity for practicing and displaying his efficiency at rabbeting and dadoing. Hence the two ends of the base pictured in Figure 2.86 are rabbeted into the sides, and the handle that divides

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	5/8	3 3/4	15	Sides
2	5/8	3 3/4	8 1/2	Ends
1	1/2	7 1/4	13 3/4	Bottom
1	5/8	7	14 1/4	Handle-separator
2–4	1/2	3	3 13/16	Dividers

the box lengthwise is dadoed into the ends, as illustrated. The compartment dividers can be dadoed into the sides and butt-jointed to the handle-separator.

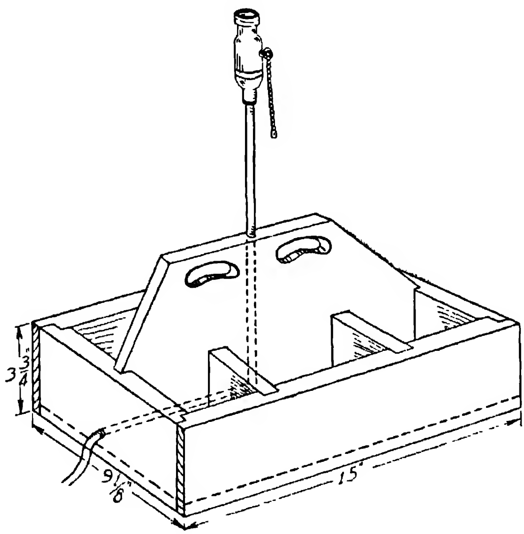


FIG. 2.86. Nailbox lamp.

A 1/8-in. nipple is inserted in the center of the top edge of the handle and the light cord led down through a 1/4-in. hole bored vertically through the handle and bottom. A channel is routed out on the lower edge of the handle-separator so that the wire can make its exit through a hole in one of the ends, as shown in Figure 2.86. The wire must be in position before the handle is glued in place. The bottom can be covered with felt.

Glass Block Lamp. An effective modern lamp can be easily assembled from a 7 3/4-in. glass building block and four pieces of 4-in. scrap lumber.

As shown in Figure 2.87, the glass block is set flush in a frame of three pieces

of wood ¾ in. thick. The toppiece is mitered to the sides, which are let into the shaped bottom piece.

A ⅛-in. nipple is mounted in the center of the top of the frame, and the cord lies between the ridges of the glass block's edges, coming out through a hole drilled in one of the sides.

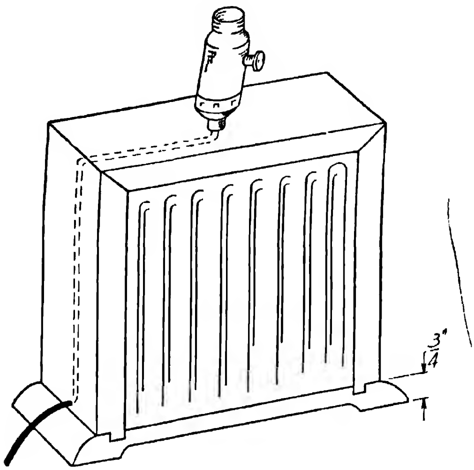


FIG. 2.87. Glass block lamp.

To hold the glass block tightly within its frame, ¼-in. dowels, sanded on one side, are bradded and glued inside the frame to correspond with the grooves in the edges of the block.

Glass blocks are also obtainable 5¾ in. and 11¾ in. square, and include transparent, translucent, or prismatic dimensional glass.

Plastic Lamp. A modern lamp with a deceptive spiral effect (Figure 2.88) is easily assembled from sixteen ¼-in. plastic 4-in. squares, separated by ½-in. rings cut from a cylinder of 1½-in. diameter. If the plastic squares are transparent (Lucite or Plexiglass), or a translucent white, the cylinder may be of black plastic or black lacquered wood. If wood, a 7/16-in. hole must be drilled, through which to thread the ⅛-in. pipe for the electric cord. In the case of a plastic cylinder, whose inside diameter will invariably exceed 7/16 in., wooden spacers must be cut to center the pipe.

The base, if it is to be lacquered black, can be of any available ¾-in. hardwood, 5½ in. square, with beveled edges. A channel is cut to lead the wire out through one edge and a hole is countersunk on the underside to receive the lock nut at the end of the pipe, as pictured in Figure 2.88.

A wooden or plastic ½-in. collar is cut to fit over the top square and drilled to receive the threaded top of the pipe. The latter should be accurately measured so that after the bottom lock washer is lightly screwed on, and the base and all

plastic squares, together with their spreaders, are threaded onto the tube, plus the top collar, the upper end or nipple can be screwed into the bottom of the pushbutton socket tightly enough to clamp the lamp assembly together. A few turns of the lock washer may be necessary for final tightening.

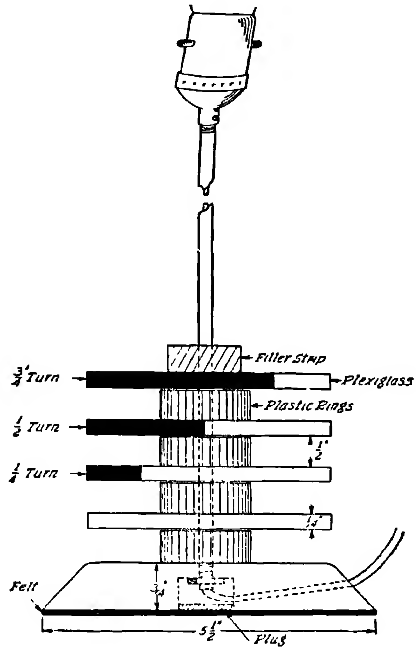


FIG. 2.88. Plastic lamp.

To form the spiral effect, the bottom square (without spreader), is placed with its edges parallel to the base. Each square thereafter, separated by its spreader, is turned one quarter to the right, making every fourth square parallel to the fourth one below, as shown in the diagram.

In sawing the squares, a fine-toothed saw will reduce the need for extensive finishing of the sawed edges; the masking paper should be left on while the material is being processed. To remove saw marks the edges can be dressed down with a file or a disk sander, followed by No. 1½ in. sandpaper and successive grades down to No. 4/0.

The masking paper may now be stripped off and the edges ashed on a buffing wheel with FF or FFF pumice stone worked into a paste with water. As in all operations with plastic, the speed of the buffing wheel should be relatively slow to prevent overheating. Warm water and soap are used for a final cleaning.

Instead of black and white, plastic squares and disks of contrasting colors

can be used. Translucent colors of pink, rose, or emerald quartz are obtainable, or the stronger ruby, sapphire, ultramarine, and yellows, as desired.

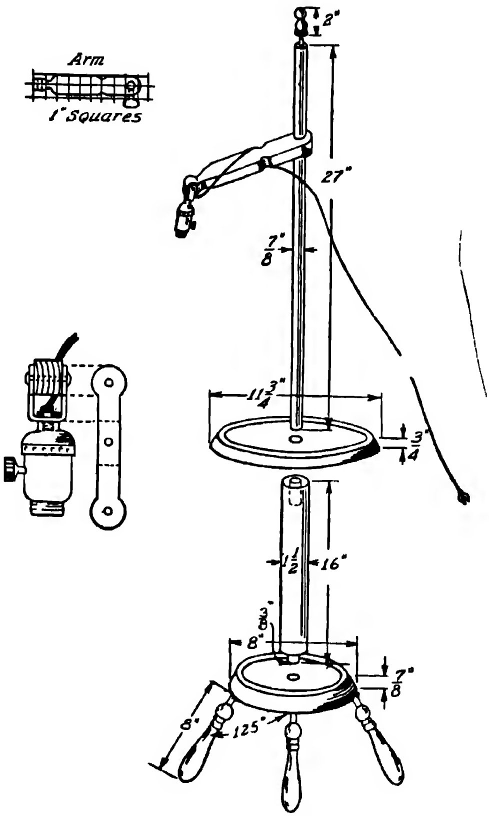


FIG. 2.89. Colonial bridge lamp

Colonial Bridge Lamp. A Colonial-styled bridge lamp with an armchair-height circular shelf (Figure 2.89) is a project that will yield satisfaction out of all proportion to the simplicity of its construction. For those having access to power tools, graceful turnings can be substituted for the simple round columns and the feet shaped by hand. For the worker with hand tools, an octagonal base, shelf, and column can be used, with a satisfactory effect.

The diameter of the circular base is 8 in., with a beveled or molded edge. On the underside an equilateral triangle is laid out as a pattern for the holes that are to be bored, as explained in the description of the Early American table (page 81), so that all legs splay outwards at a 125° angle. A ¾-in. hole is bored through

the center of the base; into this the tenoned end of the subcolumn is inserted and wedged from underneath.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	7/8	8	8	Base
3	1	—	8	Legs
1	1½	—	16⅜	Subcolumn
1	¾	11¾	11¾	Shelf
1	7/8	—	27	Column
1	7/8	1¾	9¼	Arm
1	7/8	—	2	Finial

The circular shelf or table (Figure 2.89) is cut with a 11¾-in. diameter. If a drill press is available, concentric circles just inside the edge on the upper surface and around the center can be routed out for decorative effect. A 7/8-in. hole is bored through the center of the shelf table, down into the top of the subcolumn to the depth of 1 in., to take the bottom end of the upper column. A double-ended dowel screw can be employed to afford added rigidity to this joint.

The arm is carved out of 1⅛-in. stock with a 7/8-in. hole bored at one end to slip over the upper column. A small hole is drilled to one side of this large hole for a wooden peg to pass through into a series of holes drilled in the side of the upper column, so that the arm can be adjusted for height. If a screw box and wood tap are available, a wooden thumbscrew can be turned to fit into the arm, eliminating the series of holes along the column.

A pushbutton lamp socket with a bracket-type, pivot base is riveted to the outer end of the arm, as illustrated in detail in the drawing. If this standard style of socket is not available, a bracket can be cut from sheet brass, as shown. The large hole in the center of the pattern fits over a short piece of ⅛-in. nipple screwed into the socket's shell, and is capped with a flat knurled nut, through which the lamp cord is led out. Under no circumstances should a pull-chain socket be used, because a balky chain is liable to pull the whole lamp over if the arm is swung off-center.

The finial can be a turned and doweled piece, or in the shape of a square or round pediment, or a simple ball, as preferred.

Floor Lamp Table. The modern trend toward versatility in furniture designing is most frequently exemplified in the dual-purpose functions assigned to occasional or end tables. One such combination is the table with a built-in floor lamp, whose simple construction is illustrated in Figure 2.90.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	3/4	20	20	Top and shelf (plywood)
3	1 1/4	—	19	Legs
3	1 1/4	—	8 1/2	Shelf supports
1	1 1/4	—	25	Lamppost
1	1 1/8	2	10	Bracket

The construction of the table has already been described under "Plywood Projects—Corner Table" (page 58). Large dowels, medium-sized wooden drapery rods, brass or aluminum tubing, or polished electric conduit can be used for the legs, shelf supports, and the lamppost.

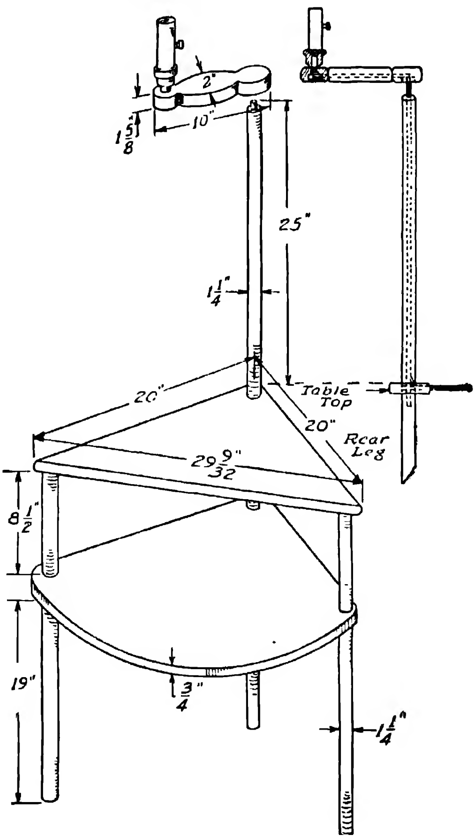


FIG. 2.90. Floor lamp table.

The latter can be left solid, if of wood, with the lamp cord hanging free from the bottom of the bracket, or if power tools are available (or hand tools are used with patience and care), the column can be routed out to conceal the electric cord. A customary procedure for hollowing out a hole down the center of a long piece of stock is to rip it lengthwise, and after clamping a half section tightly in an improvised jig, to plough a ¼-in. groove down the center of the entire length. After the parts are glued together the seam is sanded smooth.

With the column glued together, a saw kerf ¼ in. deep is cut around the upper end, 1⅛ in. down from the top, which is then chiseled and filed into a round tenon, ⅝ in. in diameter. If the cord is to be also concealed in the interior of the bracket arm, a lead-out hole must be provided in the tenon at this point. The lead-out hole for the plug end of the wire is drilled out through the thickness of the shelf, as shown in Figure 2.90.

The bracket has a ⅝-in. hole bored in one end to fit over the column's tenon. For concealed wiring one continuous hole can be drilled in the drill press, or two meeting holes bored with a hand brace, unless the rip-and-groove method is resorted to. The conventional ⅛-in. nipple is forced into the upper surface of the outer end of the bracket, with an electric candle-lamp assembly screwed to it.

The lamp cord is of course attached to the electric fixture first, then threaded through the nipple and the bracket. Before the bracket is placed over its tenon, the electric cord must be threaded through the column, past the lower dowel, which is channeled to receive it, and out of the shelf, after which the plug can be attached to prevent its free end from being accidentally pulled back into or through the column. In taking up the slack after assembling the lamp, the cord should not be pulled any tighter than necessary, for there must be sufficient slack remaining to permit the bracket being turned at will.

The top of the column can be finished off by a plain section of the rod or pole, doweled into place, or with any suitably turned finial or curtain-rod tip.

BOOK ENDS

Like modern lamps, book ends are appearing in forms whose variety is limited only by the imaginations of their designers. Many are typical "conversation pieces" intended to stir interest, while others contain a visible reference to their owners' hobbies or vocations.

Symbolic Book Ends. Simple blocks of interestingly grained hardwoods 6 or 7 in. high and approximately 5 in. wide, are jointed to horizontal base pieces 4 or 5 in. long to form separate book ends. If the wood or ornamentation is light, a mortise is cut in the underside of the base to receive a length of sheet lead, which is nailed or screwed in place and covered with a layer of felt.

For the nautically minded, small doweled-up steering wheels, whittled anchors and chains, miniature roped capstans, replicas of marine telegraphs or small boats "sailing on a painted sea" can be attached to the upper surfaces of the basepieces

to accent the owner's avocation or occupation. For the golfer, a pair of upright wooden tees to which a new golf ball and a badly cut one have been cemented will serve to remind him of his duffer days. The Kelly pool player, or chronic pessimist, will be grimly amused by a pair of 8-balls. The enthusiastic camper's eyes will gleam reminiscently at the sight of a pair of book ends upon which lean-to's or log cabin ends have been painstakingly glued and bradded from cut twigs with the bark on.

Continuity Book Ends. Another class of book ends represents the optical illusion of continuity of action or substance through the intervening books. Examples of this type of design are a model railroad engine which has been cut into thirds with the front and rear parts mounted to face in the same direction. Or the capstans and anchors previously mentioned may be seemingly connected by lengths of rope or chain that disappear horizontally into holes of equal height in each of the upright portions of the book ends. An even more dynamic effect is obtained in the same manner when the small figurine of a Mexican, for example, seems to be futilely tugging at a rope passing from his book end to a stubborn burro at the other end; or a small boy trying to dissuade a large mastiff on a through leash from examining a fire plug.

The same illusion can be combined with the owner's avocation. For the archer, an arrow with the center section cut out and two ends mounted horizontally in holes bored in the book ends' upright members as if transfixing the intermediate books. The same principle would apply to a polo mallet, golf club, harpoon, saber, or fishing rod. The illusion will naturally be heightened if the number of books placed between the bookends causes the severed ornamental implement or weapon to appear at normal length.

Invisible Book Ends. A surprising effect can be obtained by inserting a pair of commercial metal book ends inside a pair of well-bound and well-read books which have had their pages wired and glued together. Since the average short outer bases of these metal book ends are 1⅝ in. wide, books of this minimum thickness should be selected, in order to conceal the short tab, as indicated in Figure 2.91. A "mortise" is cut in the lower edge of one book cover through which the long inner base is to extend. Holes punched in the upright frame can be wired with fine wire threaded through the leaves, serving the double purpose of holding them together as well as attaching them to the book end. The remaining pages and covers are glued together. If the metal book ends cannot be obtained commercially they can be cut from 16-gage metal to fit the books.

Dice Book Ends. A gluing and boring job that will produce giant "lucky" dice is all the more effective when contrasting woods are utilized. Six 6-in. squares of a 1-in. dark wood such as walnut are glued up to form each die. The edges and corners are rounded and sanded and 1¼-in. holes bored ½ in. deep with an expansive bit for each spot on the die. The centers of the corner spots are located 1¼ in. in and down from the corners.

A contrasting, light wood is cut into ½ in. × 1½ in. disks and glued in place

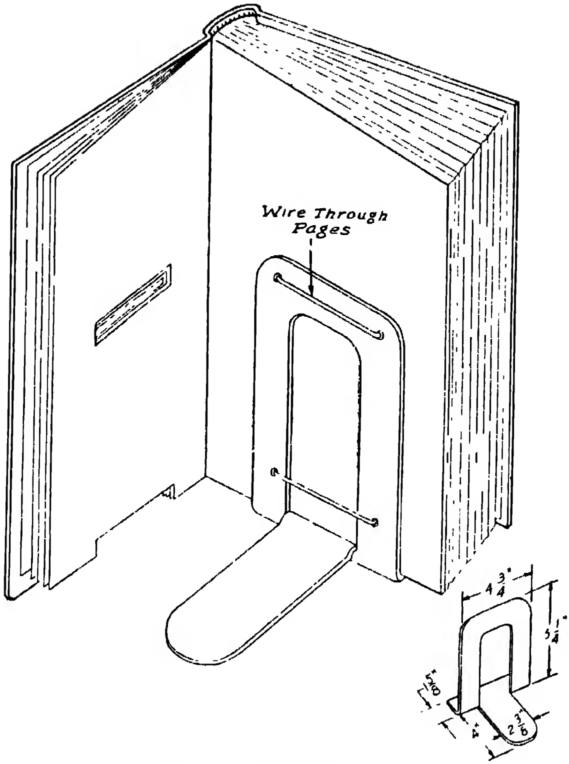


FIG. 2.91. Invisible bookends

for each spot, or plastic disks can be used if preferred. The placing of the spots on a regular pair of dice should be studied before the holes on the book end dice are bored. For a moderate stand of average-sized books, lead weights should not be necessary.

MISCELLANEOUS

Humidor. An interesting humidor, which is easy to construct, takes the form of a rectangular urn or coffer (Figure 2.92). Assembled from mahogany or walnut plywood with brass handles, if properly jointed it will present a striking appearance amid the smoking paraphernalia.

All four sides are cut simultaneously to the pattern in Figure 2.92. Then their edges are beveled to form accurate miter joints. They are then glued and clamped; when dry, the base is cut to project ½ in. into the bottom, and is glued in place.

Either a screw top or flush-rim round tobacco or other type can will be satisfactory to line the wooden casing, provided it is the proper size. Its rim should fit ½ in. below the top, which is cut to sink flush with the top edges of the sides. Small wood scraps can be glued to the base if necessary to raise the can, and

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4	½	6	6	Sides
1	1¼	5½	5½	Base
1	½	5¼	5¼	Top
1	¾	6	6	Cover

graduated corner blocks can be glued to the inside to reinforce the corners and hold the can in place. Additional blocks can be inserted to wedge the can tightly up against the top.

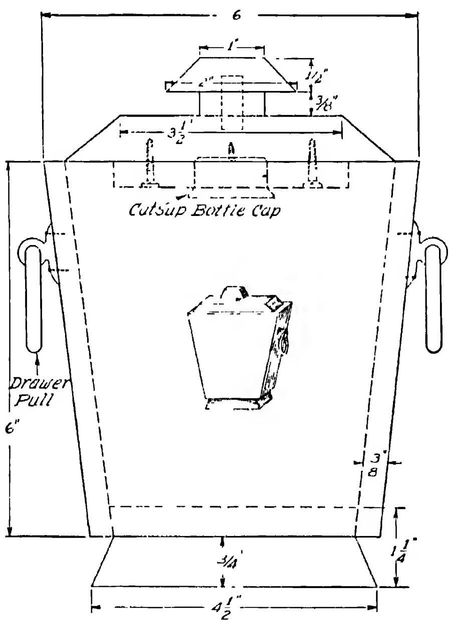


FIG. 292. Humidor.

Replicas of Duncan Phyfe drawer pulls, with brass lions' heads, available at some woodworkers' supply houses, make attractive handles for this project.

Before the top is cut to fit, however, a round hole should be cut to fit over and conceal the can's edges. If a very small hole is drilled and a fine jigsaw blade threaded through it, a round section can be cut out that can be refitted into the opening as a part of the cover.

The latter is cut from ¾-in. stock the same size as the top, and its edges

beveled. Before the top is fastened in place it is used as a templet for the cutout disk, which is bradded and glued to the exact center of the underside of the cover.

When the top is dry, a hole is bored through the wooden disk into the underside of the cover, to accommodate a catsup bottle cap as a sponge cup. The cup is held in place by a small screw through its center. If available, a flat disk of special Mexican clay used in commercial humidors will give more satisfactory service. Many of these clay cakes have a hole bored through their centers for a flatheaded screw and washer, obviating the necessity of sinking a cup.

The cover can be finished off with a square wooden knob made from beveled solid stock, elevated on a wooden washer. Circular round brass drawer pulls are screwed to two opposite sides as illustrated, and a suitable brass fixture can be substituted for the wooden knob if desired.

The inside of the tobacco can is lined with veneer, preferably Spanish cedar. After a piece of wrapping paper is fitted inside for size, it is used as a templet to cut a piece of veneer long enough to fit around the wall of the can. While the veneer is soaking in warm water, a circular cedar disk is fitted to the bottom of the can. The side wall strip can then be sprung into place, with or without glue. Sheetcork can be used if veneer is not readily obtainable.

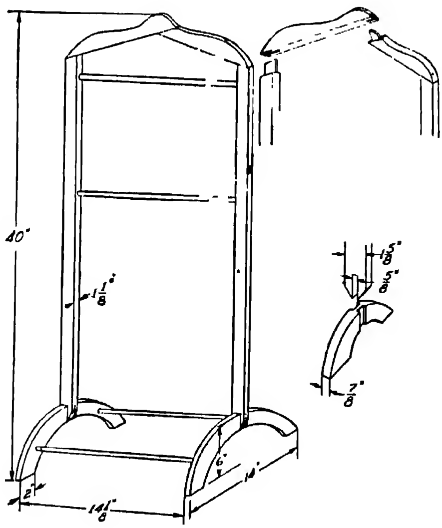


FIG. 2.93. Clothes rack.

Clothes Valet. A rack for the master's coat, vest, trousers and shoes is also available to the lady of the house, upon demand. The one described (Figure 2.93) is of simple lines, scrap lumber being used in anticipation of a paint finish. The lathe enthusiast can turn graceful side members and band saw the legs and top-piece from stock suitable for staining.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	1⅛	1⅝	36	Sides
2	⅞	6	14	Legs
1	1⅛	4	17	Top (hanger)
4	¾	—	15¼	Dowels

The legs and top after being cut out are smoothed down and all edges of the latter piece filed and sanded smooth to form a coat hanger, as in Figure 2.93. Holes are then bored for gluing in the dowels that form the trouser hanger and shoe rests. To speed up the work for a paint job, a heavy coat hanger already on hand can be fastened into the tops of the side members, and the legs sawed in a straight or triangular pattern with a band saw.

Butler's Tray. Designed for extemporaneous hospitality, a heavy-duty serving tray (Figure 2.94) can be used as a pick-up cellarette, or with the glass-and-bottle rack removed, will double as a mobile snack bar. It makes an ideal plywood project.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	½	6	19	Sides
1	½	6	28	Back
1	⅜	19¾	27½	Bottom
1	¾	¾	28	Front edging
		RACK		
1	½	5½	27	Top, rear
2	½	4	12½	Top, sides
2	½	3	17½	Sides, outer
2	½	3	12	Sides, inner
2	½	3	26	Side, back, inner and outer
2	½	2½	4	Ends, front
2	½	2½	3	Supports, rear ends, sides

The back and sides are cut according to the pattern, and a ⅜-in. dado or groove cut around the inside of each piece, ½ in. from the bottom edge. A ¼-in vertical groove is routed ¼ in. from the inside edge of each end of the backpiece to receive the ¼-in. rabbets at the rear ends of the sides.

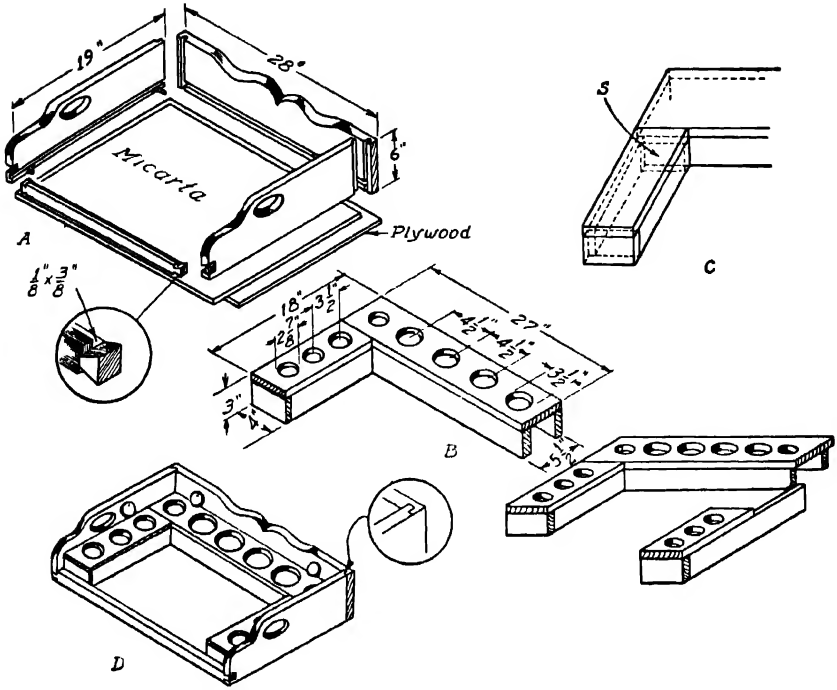


FIG. 2.94. Butler's tray.

A ¼-in. rabbet is cut along the inside top edge of the front edging piece to receive the top edge of the tray's bottom. Dovetails are cut in either end of the piece to tie into sockets in the front ends of the sidepieces, as shown in A, Figure 2.94.

The sides and back are glued and bradded together and the bottom slid into place, after which the dovetails of the front edge piece are glued together. The corners are strengthened by 1-in. angle irons screwed in place horizontally under the bottom.

The rack is a simple butt-jointed job with the back sidepieces butted against the long outer sides, as shown in detail B. Inner support pieces, (*S*) in detail C, are face-glued and nailed to the inner ends of the inner back sidepiece to support the end of the inner sides and top.

The size of the holes cut for the glasses will depend on the glassware available. The same applies for odd-shaped bottles or decanters.

The top of the tray can be satisfactorily covered by bonding to it a sheet of fiber-backed Ludlite (stainless steel), stainless Micarta, or formica; a sheet of copper is also effective and even tin or linoleum will prove acceptable. Whatever material is used, its front edge should be trimmed flush with the front of the edging strip in order to cover its joint with the tray bottom.

With the rack in place, four small wooden discs are screwed in place off center, to hold down the rack by cam action. As illustrated in D, two are above the back ends, one each above the front ends. With the interior and edges lacquered Chinese red and the exterior in black, the tray cheerfully offers hospitality on short notice.

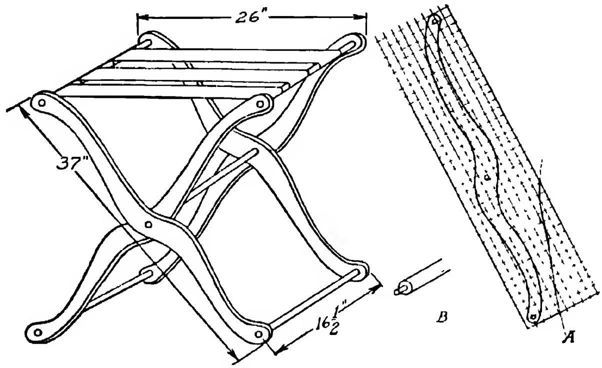


Fig. 2.95. Luggage rack.

Versatile Luggage Rack. To dispense with the back bending that the majority of low luggage racks demand, a collapsible suitcase holder can be raised to table height (Figure 2.95). Its dimensions, moreover, will permit it to fit securely under the overhanging edges of the butler's tray previously described, making it an ideal companion piece when not otherwise engaged; or it can be stored in the closet. The average suitcase will fit within the uprights, resting safely on the webbing.

This rack, too, can be cut from plywood and lacquered to match the tray. For prolonged use, however, hardwood stock will give better service at the pivot point.

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	3½	37	Legs
4	1	—	16½	Rungs (dowels)
1	1	—	17⁵⁄₁₆	Pivot (dowel)

All four legs can be band-sawed to pattern A, Figure 2.95 at one time. All four legs should be bored through their centers at the same time to insure that the legs fit without wobbling.

The spacing dowels, or rungs, are dressed down to a ½-in. diameter for ¾ in.

at each end, as in detail B. The center pivot dowel is dressed back for $1\frac{9}{16}$ in. in order to penetrate both legs.

After the ½-in. holes are bored in the leg ends and centers, the inside legs are pivoted to the outside legs, with a $\frac{1}{16}$-in. iron or leather washer between. A wire nail through the edge of each outer leg will anchor the dowel-pivot. The outer rungs can now be inserted in like manner. Three lengths of strap webbing are rolled once around each upper rung and tacked in place so that when open, the rack will not extend beyond 26 in., measured from the outer edges of each pair of upper legs.

Corner Clock. Similiar in construction to the Colonial corner cupboard described in an earlier section, the corner clock pictured in Figure 2.97*a* combines the stately erectness of the traditional grandfather's clock with the modern trend toward utilization of space and harmonious blending with backgrounds. Electric clock works can be used behind the simplified modern dial.

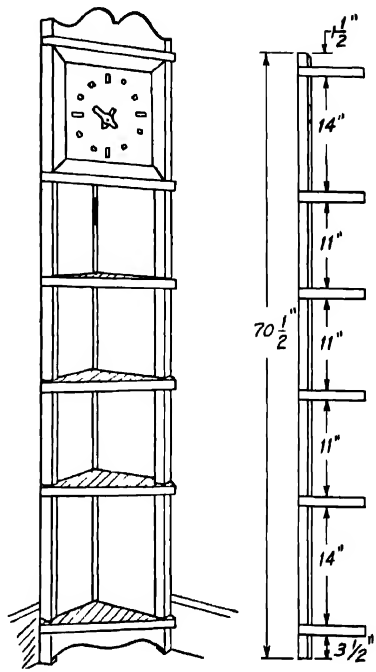


FIG. 2.96*a* Corner clock.

The rear post is ripped into a triangular upright which, after being sanded is dadoed as shown in A Figure 2.97*b*, to receive the two plywood panels. The front stiles are likewise grooved for the opposite sides of the panels. Then the triangular mortises, B, are cut to house the ¾-in. shelves.

The shelving stock is first ripped into six triangles that can then be cut simul-

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Width, in inches*	*Description*
1	1⅝	1⅝	70½	Corner post
2	⅝	1⅝	70½	Stiles
2	¼	10½	66½	Backing (plywood)
3	¾	18¾	18¾	Shelves (6)
1	¾	3½	14	Base
4	1⅝	⅝	14½	Dial frame
1	½	4	14	Plinth

taneously on the band saw to the pattern of detail C in the drawing. The front edges of all shelves are rounded.

The base is cut out as shown, with its front surface beveled down at the ends to conform to the curves of the shelf. The pediment is jigged or compass-sawed from ½-in. stock or plywood.

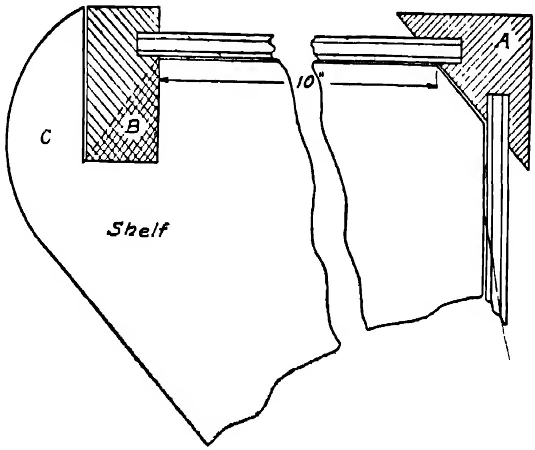


Fig. 2.96b. Corner clock.

The casing can now be assembled, with the plywood backing screwed to each shelf edge from the back. The base is pocket-screwed to the bottom shelf; the plinth is corner-blocked to the top shelf from the rear.

The pieces for the dial frame are first beveled to fit into the outer edges of the stiles, then marked and mitered. The corners should be doweled or splined so that the frame can be removed if it becomes necessary to repair the clock. Bullet catches in two opposite sides hold the frame in place.

A modernistic dial is assembled from a 12-in. square of walnut plywood, on which strips of sanded aluminum are cemented to represent the numerals. An optional styling would make use of a square of cloudy, translucent plastic with black dots and dashes of cellulose tape or thin plastic, or with round discs of plastic embedded flush with the dial surface. The hands are cut from aluminum, sheet brass, or galvanized iron (enameled or lacquered), to match the numerals.

Corner blocks are glued to the upper and lower surfaces of the shelves in the clock case for fastening the dial with removable screws.

3

OUTDOOR FURNITURE

WITHIN the limitations of season and climate, the universal urge toward outdoor living has become an important trend, which is noticeably reflected in modern architectural design. New houses are being constructed to afford privacy to verandas, loggias, and patios. Older houses are having their porches emphasized and their backyards glamorized. Picture windows and French doors are opening up the outside walls so that the formerly sporadically used porches and terraces have become integrated into the home as "outdoor rooms."

This flowing of the home's interior into the open air has naturally exerted certain influences upon porch and lawn furniture design, as well as on exterior decoration. While comfort and durability remain paramount considerations, the "outdoor living room" conception has introduced a diversity in utility and styling formerly lacking. This is especially noticeable where protection from weathering exists, either due to overhead cover or climatic conditions. Under these favorable circumstances outdoor furniture very properly merges with its more delicate-appearing indoor counterparts.

Construction Details. In general, however, it is the accepted fate of outdoor furniture to be left to the mercy of the elements for weeks and months at a time. This requires a rugged type of construction whose basic simplicity makes optional the use of the more complicated forms of joinery. Since there is no need to hide the heads of screws or nails, the lowly butt joint may well come into its own, and a simple set of hand tools suffice for all operations, with the possible exception of the cutting of satisfactorily rounded wheels. If these are not obtainable from a local lumber mill or woodworking shop, it is often possible to utilize the disk wheels from toy wagons or scooters, particularly when the finished piece is to be painted. It should be observed in passing that galvanized screws and nails are sufficient for this outside construction, unless salt air is prevalent. In the latter case brass or bronze screws and cement-coated or copper nails will furnish the necessary corrosive resistance. Where glue is used it should, of course, be waterproof.

Choice of Wood. When selecting a wood for outdoor construction it is well

to choose a heartwood that is relatively resistant to decay; the untreated sapwood of nearly all species has a low resistance to decay. As noted in Chapter 1, the different species of woods are decay-resistant to varying degrees. The Forest Products Laboratory of the U.S. Department of Agriculture lists native heartwoods under the following five catagories:

Durable under conditions favoring decay	Cedars Chestnut Cypress, southern Redwood Walnut, black
Intermediate durability; nearly as durable as some of the preceding group	Douglas fir (dense) Oak, white Pine, southern yellow (dense)
Intermediate durability	Douglas fir (unselected) Gum, red Pine, southern yellow (unselected)
Between intermediate and nondurable group	Ash, commercial white Beech Birch, sweet, yellow Hickory, western Maple, sugar Oak, red Spruce
Low in durability under conditions favoring decay	Basswood Cottonwood Fir, commercial white

Finish. Hand in hand with the selection of the kind of wood goes the choice of finish. For white and colored effects, a good grade of lead and oil gloss paint applied in at least three coats will suffice under normal conditions. At the seashore, or wherever salt air is prevalent, it is advisable to substitute 15 to 20 per cent zinc white for a like amount of white lead. Since the zinc requires more oil to break it down, it should be mixed separately before adding it to the lead mixture.

Mildew may develop on paint that is continuously exposed to damp, humid, and shady conditions, especially when the paint film is soft. White paint containing both lead and zinc requires a minimum of oils and therefore dries so hard that it is highly resistant to mildew. Darker paints require more oil and are consequently more subject to mildew.

Mildew Prevention. Although some ready-mixed paints now contain a mildew-preventive compound, the home painter can procure his own fungicide and add it to his prepared paint without difficulty. To harden the film, the oil that

has risen to the top of the unstirred paint is poured off at the rate of one pint to the gallon of mixture. This is replaced by one-half pint of turpentine to each gallon of paint. The additional preventive of an ounce of mercurous chloride (calomel), dissolved in the turpentine before mixing, will produce a paint whose hard, fungus-proof film will be highly resistant to the sooty or rusty mildew deposits.

Colors. The choice of colors is a matter of personal taste. Garden furniture is commercially finished in an unobtrusive green or in the universally satisfactory white, which is prone to chalking. Nowadays there are available durable, sun-resistant enamels with alkyd-resin bases, and for furniture constantly exposed to sun and weather it may prove advisable to finish with an automobile enamel. Whatever the medium used, the home painter can indulge his or her fancies in two color applications. With a bright flower garden or shrubbery background providing the dominant color note, the furniture can well be subordinated by using contrastingly cold colors, such as a French gray and blue. On a tiled terrace, or against a brick wall, the warm colors of the bricks might be picked up in the furniture seats or table tops, with the brown door and window trim reflected in the legs and uprights. Suggested color combinations are included in Chapter 5.

Finishing Methods. When it comes to the matter of application, there are many amateur painters who are either unmethodical in their procedures, or are so engrossed in appearance and color that they lose sight of the fact that the primary reason for painting any outdoor construction is to preserve it. This is likely to result in the omission of large areas concealed from sight, which receive no benefit of a protective paint film. By upending the piece of furniture and painting the lower parts first, not only will the unseen surfaces receive their share of paint preservative, but much bending of back or knees will be avoided. Special attention should be paid to all sides and crevices of joints, where water can enter and remain to the detriment of end grains. A spray gun is most useful at these points.

Furniture constructed from milled lumber that is to be stained or finished "natural" must have its pores thoroughly closed to resist the corrosive effects of weathering. The matter of fillers and finishes is thoroughly covered in Chapter 5; it is well to remember, however, that a final coat of a good grade of exterior spar varnish is excellent weatherproofing. If spare time is rationed, it is good practice to coat the raw wood with raw linseed oil as partial protection until the final finish can be applied, at some later date.

In conclusion it is suggested that the styling and, to some extent, the finish of most outdoor furniture described in this chapter are such that it will render year-round recreational service indoors in the rumpus room, when seasonal changes curtain off the extra "outdoors room." Peasant painting with a protection coating of spar varnish will enliven the recreational hours, both indoors and out. The sturdy nature of the construction is suitable for withstanding hard usage by teenagers and careless oldsters, after a seasonal tightening up and finishing job.

CHAIRS

Two characteristics strongly accented in most outdoor chairs are a strong, weatherproof type of construction and extreme concessions to comfort. Since the emphasis in outdoor living is placed upon leisure, the lines of the popular types of chairs are more relaxed, with the backs tilted to semireclining angles, to encourage easy lounging. Colorful, waterproof fabrics are available to cover the cushions that replace the indoor upholstery, with woven rope often substituted for the familiar steel springs.

Folding wood or metal chairs are resorted to when space consideration are paramount. In other cases chairs and settees may assume massive proportions. Mobility can be restored to this type of furniture by the addition of a pair of wheels attached to one pair of legs, as is explained later.

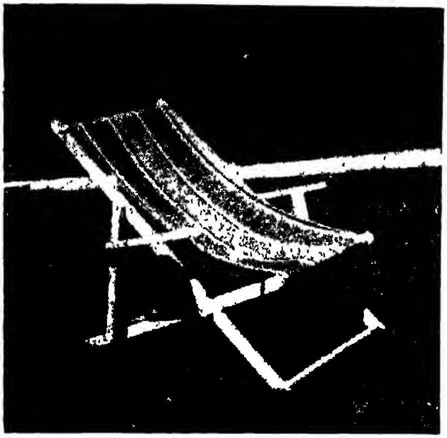


FIG. 3.1*a*. Beach chair.

Folding Beach Chair. An old favorite, not only on the beach but in the garden or on the porch, is the easy-to-close but sometimes hard-to-open folding beach chair (Figure 3.1). With its arms, adjustable back and suspension seat, it is one of the most comfortable of lounging chairs. Simply constructed of ¾ in. × 1⅝ in. hardwood, the legs are separated by lengths of 1-in. doweling; its awning material seat is instantly removable whenever it becomes inconvenient to store the entire chair.

LUMBER LIST

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
(*A*) 2	¾	1⅝	48	Back legs
(*B*) 2	¾	1⅝	42½	Front legs
(*C*) 2	¾	1⅝	20	Back rests
(*D*) 2	¾	1⅝	10½	Arm supports
(*E*) 2	¾	1⅝	16	Arms
(*F*) 2	1	—	20	Stretchers (dowels)
(*G*) 2	1	—	17⅞	Stretchers (dowels)
(*H*) 1	1	—	21⅝	Stretchers (dowels)

The ends of all members are rounded and the arms scooped out to a 7/8-in. thickness at their rear ends as shown in Figure 3.1c. The 3/4-in. holes for the dowel-stretchers are bored completely through both ends of (*A*) and (*B*), and at one end of back rests (*C*). To avoid splitting, these holes should be no nearer the ends than specified in the drawing.

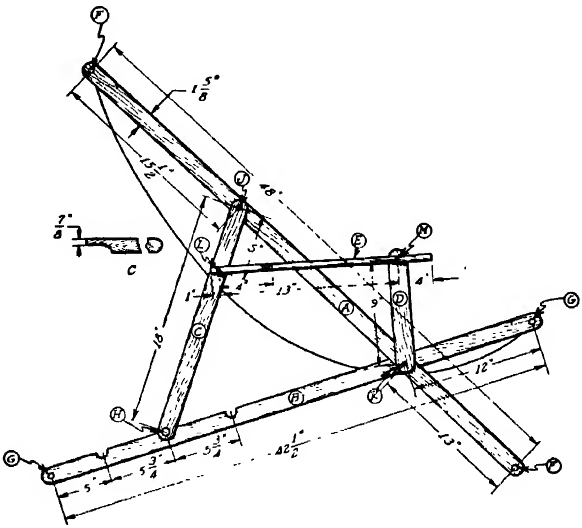


FIG. 3.1*b*.

Tenons of 3/4-in. diameter are cut or turned at the end of each stretcher for a tight fit into their respective holes. Stretchers (*F*) and (*G*) are fitted into (*A*) and (*B*) respectively, and stretcher (*H*) into the lower ends of (*C*). Instead of wedges, finishing nails are driven into the tenoned ends of the stretchers from the undersides, to prevent spreading.

Legs (*A*) and (*B*) and back rest (*C*) are fitted together and the holes bored for rivets (*J*) and (*K*), as pictured. Three notches 1/2 in. deep are cut in the back legs as shown, commencing 5 in. from the ends and separated on 5 3/4-in. centers. Metal washers are slipped over the outside ends of the rivets (*J*), after which they are peened flat. Meanwhile arms (*E*) can be riveted to support (*D*) at (*M*).

Supports (*D*) are now threaded onto long rivets (*K*). After the latter are peened, the arms (*E*) are leveled off to check the location of rivets (*L*). The riveting of the latter at this point completes the construction. It will be noted that all rivetheads are tight against passing surfaces so that the bulkier peened ends are on the outside where they will not block the clearances necessary when the chair is folded.

A 50-in. length of awning material is cut and hemmed to a 16 5/8-in. width with horizontal hems 1 3/8 in. wide at each end. A 21-in. section of solid metal curtain

rod can then be slipped through each end hem so that the canvas seat can be looped over the top stretcher of the front legs and the front stretcher of the back legs to form a removable suspension seat.

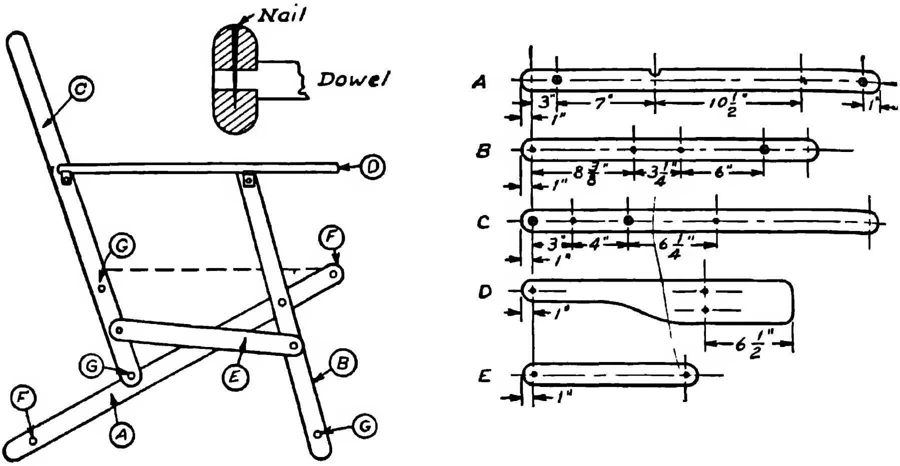


FIG. 3.2. Folding yachting chair.

Folding Yachting Chair. Space savers when not in use, canvas-seated yacht or deck chairs are handy for entertaining extra guests (Figure 3.2). Similar in construction to the folding beach chair, they are bolted together from ¾-in. hardwood about 1½ in. wide, and will withstand considerable abuse.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
(*A*) 2	¾	1½	26	Back legs
(*B*) 2	¾	1½	21½	Front legs
(*C*) 2	¾	1½	26	Backs
(*D*) 2	¾	3	20	Arms
(*E*) 2	¾	1½	12¾	Connectors
(*F*) 2	1	—	20	Front seat and back leg dowels
(*G*) 3	1	—	22½	Rear seat, bottom back, and front leg dowels

As shown in the detail, all of the parts are cut with rounded ends. The only differences between the back legs (*A*) and the backs (*C*) are a notch in the latter,

10 in. up from the foot end, and the location of the holes for the dowel tenons. The details indicate the exact location of all holes that must be bored. The dowels are tenoned to fit into holes of ⅝-in. diameter.

To assemble, the back legs (*A*) are first bolted to the insides of the front legs (*B*) by means of flatheaded bolts with washers under the nuts. The front and back dowels (*F*) and (*G*) are then tenoned into place and anchored with short finishing nails as shown in detail A.

Next the two dowels (*G*) in the lower part of the backpieces (*C*) are fitted and anchored into their tenons, and the frame is "dry"-fitted into its notches in the back legs to insure that its sides are flush with those of the front legs. The connectors (*E*) can then be bolted into place.

All that remains is to attach the arms (*D*). These are secured to the tops of the front legs and almost halfway up the back by means of angle irons. The latter can be securely fastened to the underside of the arms, but must be permitted to pivot on single bolts that pierce the front legs and back members. To prevent tearing the users' clothes, it is best to use flathead bolts from the inside, lightly peened over washers on the outside.

The seat and back can be made removable in the same manner as explained in the previous section on the folding beach chair. Curtain rod sections in this case, however, are apt to prove cumbersome and will interfere with folding the deck chair. If the canvas seat is tacked to the inside edges of its dowels, it can easily be removed at some later date. The same is true of the 18-in. wide strip of canvas that forms the back. No rigid dowel or other member interferes with a comfortable conformation of the canvas back to that of the sitter. Both pieces of canvas should have their edges hemmed or bound to prevent fraying and consequent loosening from their long tacks. Both pieces should also be stretched tightly when installed, because constant use and heavy occupants will result in sufficient slack.

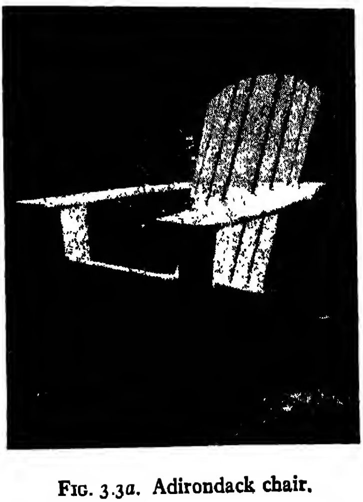


FIG. 3.3*a*. Adirondack chair.

Adirondack Chair. Another sturdy all-weather lawn chair that has retained its popularity through the past decade is the so-called Adirondack chair (Figure 3.3*a*). The model described below is a variation that retains the basic seat slant and back rake so essential to comfortable lounging.

The back legs (*B*), arms (*L*), and arm supports (*M*) are compass- or band-sawed in pairs according to the patterns in Figure 3.3*b*. The back splats (*E*, *F*, and *G*) can be cleated together and their top ends cut to a wide arc, although a satisfactory effect is secured by leaving the top end of the center splat square

Lumber List

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
(*A*) 2	1⅛	4½	21	Front legs
(*B*) 2	¾	6	31	Back legs
(*C*) 1	¾	3⅝	23¼	Front stretcher
(*D*) 1	¾	4½	19½	Back seat rail
(*E*) 1	¾	4½	33¼	Back, center splat
(*F*) 4	¾	2½	33¼	Back splats
(*G*) 2	¾	2⅜	16½	Back splats
(*H*) 1	¾	1¾	21½	Back top rail
(*J*) 1	1¼	2¼	26	Back and arm brace
(*K*) 1	¾	1¾	21	Back cleat
(*L*) 2	¾	7½	28½	Arms
(*M*) 2	¾	3¾	9½	Arm supports
(*N*) 6	⅝	2½	21	Seat slats

and sawing the three splats on either side diagonally downward 2¾ in. Mortises are cut in the front legs to house the front stretcher (*C*) so that its lower edge will be 6½ in. above the ends of the feet.

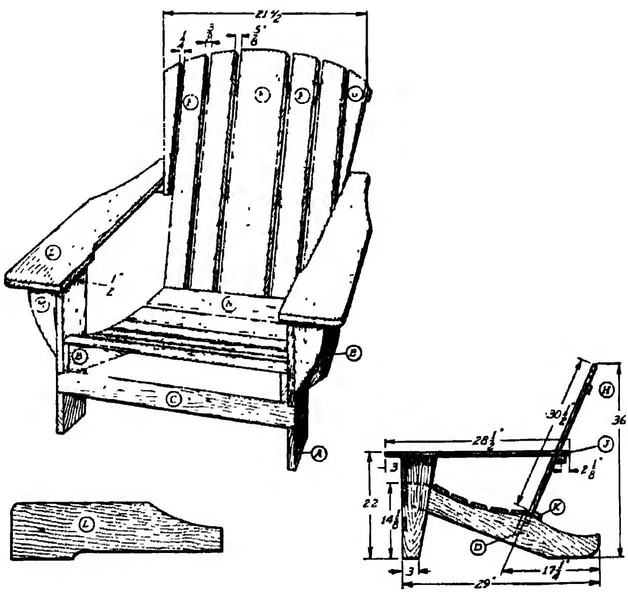


Fig. 3.3*b*. Adirondack chair.

To insure a rake of 17¼ in. for the back, the brace (*J*) for the center of the back and the inner ends of the arms is beveled on its narrow edge so that the top surface measures 1⅞ in. and the bottom, 2¼ in.

The first step in assembling is to screw the arm supports (*M*) to the front legs from the inside, flush with the outer edges. Next the back legs (*B*) are face-screwed to the front legs (*A*) so that the upper edges of their front ends are flush with the outer surfaces of the front legs and 14⅛ in. above the ends of the feet. The front stretcher (*C*) is then lapped into its mortise and the back cleat (*K*) lightly nailed across the tops of the rear ends of the back legs (*B*) approximately 18½ in. from the front ends.

The back splats can be screwed to their top rail (*H*) with descending spacings as indicated in the drawing. With the frame laid on its side, the back assembly is placed in position against cleat (*K*) so that a rake of 17¼ in. will result. It will be found that the center back splat (*E*) will measure approximately 30½ in. above back cleat (*K*) when in this position. Back seat rail (*D*) is now fastened in position.

The arms can now be laid in position resting upon the back and arm brace (*J*). The latter is moved up and down until the arms are horizontal, allowing a 2⅛-in. overhang at the back, and its position marked across the back splats, to which it is then face screwed. Before fastening the back assembly firmly between cleat (*K*) and rail (*D*), it is wise to again check that the chair arms are horizontal. When the back has been screwed to rail (*D*), the arms can be fastened in place to brace (*J*), legs (*A*) and supports (*M*). All that remains is to screw the six chair slats across the back legs at regular intervals. All edges of these slats are chamfered, with the front edge of the front slat well rounded and sanded.

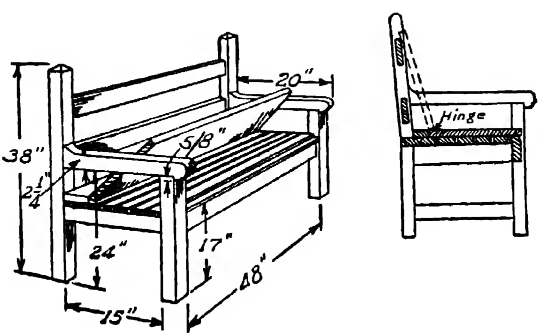


FIG. 3.4. Garden bench.

Garden Bench. The bane of garden sitters is the damp seats encountered in outdoor furniture that remains outside during rains, fog, and dew. To eliminate this annoyance, the bench pictured in Figure 3.4 has a hinged tongue-and-groove

LUMBER LIST

Chair

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4	1⅝	1⅝	26	Legs
2	¾	5	25	Side rails
2	¾	4¾	26	Arms
1	¾	1⅝	23¼	Arm cleat
1	¾	2½	23¼	Back bottom cleat
4	¾	4¾	30	Back splats
1	½	1⅝	20	Back top cleat
6	¾	3½	23¼	Seat slats
2	¾	1⅝	23¼	Front and back stretchers
2	¾	1⅝	25	Side stretchers

Table

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	3¾	20¼	Shelf cleats
1	¾	27½	26¾	Shelf (plywood)
1	¾	23	30	Top (plywood)
2	¾	5	73¼	Connecting rails

For added strength, it will be noted that four stretchers are provided for each chair. If it is anticipated that this lengthy piece of combination furniture will be subjected to much moving about, strain on the outside arms will be lessened if the connecting rails are lengthened about 1½ ft. to provide 9-in. handles at either end, cut out and rounded in the style shown for the rolling lounge in a later section.

TABLES

Occasional Tables. Strategically placed occasional tables are as important to the comfort of the occupants of the outdoor living room as they are elsewhere in the home. Indeed, during warm spells, chairside tables and stands are almost a necessity for holding cooling drinks, as well as smoking necessities, sun glasses, magazines, and books.

A pair of the square-edged little end tables pictured in Figure 3.6 can, when equipped with suitable latches such as window catches on their undersides, be

fastened together to form a solid cocktail table or snack stand of surprising capacity.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	5⅞	23½	Top (11¾ in. wide)
2	1⅛	4¼	13	Cleats
3	¾	3	21¾	Legs
1	¾	1½	21½	Stretcher
1	¾	1½	7	Stretcher

According to the formula for finding the dimensions of a polygon, the sides measured off in a 23½-in. square will be 9¾ in. The pieces forming the top can therefore be cleated together as shown in the detail in Figure 3.6, and the four sides cut to dimensions. The cleats are attached so that they will permit a 2-in. overhang when the legs are screwed to the cleat edges.

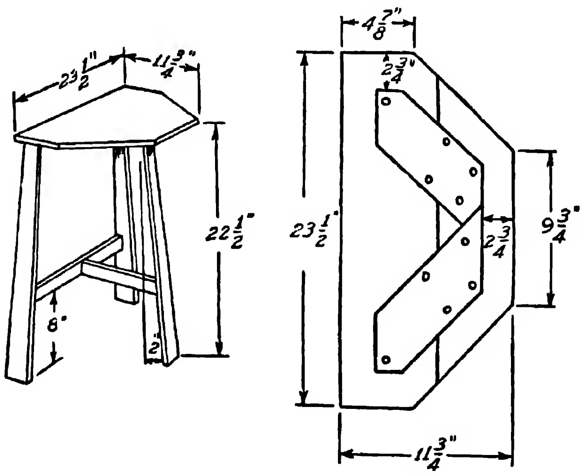


FIG. 3.6. End table.

The legs are tapered from 2 in. at the top to 3 in. at the bottom and are maintained at a 2-in. rake by two stretchers, butt-jointed in the center, as shown. An optional method would be to lengthen the stretchers into through keyed tenons at all three joints.

If it is not intended to mate two of these identical end tables as coffee tables, the edges of the tops can be beveled or rounded.

Modern End Table. Knocked together from rough lumber with butt joints and section of rollings pins or wooden poles found in the centers of rolled-up rugs, this streamlined table when painted will not only present a smart appearance, but will also offer a welcome amount of handy shelf space. The round members can be doweled in place, or plugged and screwed.

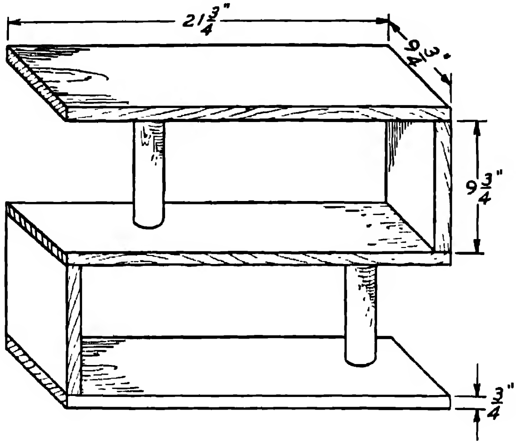


Fig. 3.7. Modern end table.

The dimensions in Figure 3.7 can be varied to conform to the furniture the table is destined to fit. If constructed of bleached hardwood stock with mitered corners and dark, sanded columns, or selections of brass or chromium pipe, the table can take its place indoors with the latest examples of modern styling.

Cocktail Table. The mention of rolling pins as bona fide aids in furniture construction brings up other possibilities. One of the simplest yet most effective uses for rolling pins in furniture design is as legs for a modern low coffee or cocktail table.

The top can be of ¾-in. waterproof plywood for outside use, cut oblong, octagonal, or round. After the handles of the rolling pins are removed, they can be doweled into the plywood without the use of cleats or rails. If screwed from the top, a formica, Micarta, or treated linoleum covering can be cemented over the top.

Used with a well-grained piece of hardwood or hardwood veneer top, such a table would be a handsome addition to the indoor living room.

Ratchet Table. An unusual table that takes the form of a wooden jack is nevertheless quite useful and easy to make (see Figure 3.8). Capable of being raised or lowered at will, it is available for various purposes as well as to function beside chairs with or without arms.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
(*A*) 2	$\frac{3}{4}$	6	12	Top (12 in. square)
(*B*) 1	$\frac{3}{4}$	2	8	Cleat
(*C*) 2	$1\frac{1}{8}$	6	12	Base (12 in. square)
(*D*) 2	$\frac{3}{4}$	$1\frac{1}{8}$	$16\frac{1}{2}$	Uprights
(*E*) 1	$\frac{3}{4}$	$2\frac{1}{4}$	$7\frac{1}{4}$	Crosspiece
(*F*) 1	$\frac{3}{4}$	$1\frac{1}{2}$	18	Ratchet leg
(*G*) 1	$1\frac{1}{8}$	$1\frac{1}{8}$	$4\frac{1}{2}$	Ratchet foot
(*H*) 1	$1\frac{1}{8}$	$1\frac{1}{2}$	$2\frac{1}{4}$	Pawl

This is a piece of furniture that will give better service if the ends of the two uprights are mortised and tenoned, or at least doweled into their base and crosspiece, and the ratchet leg into its foot and cleat.

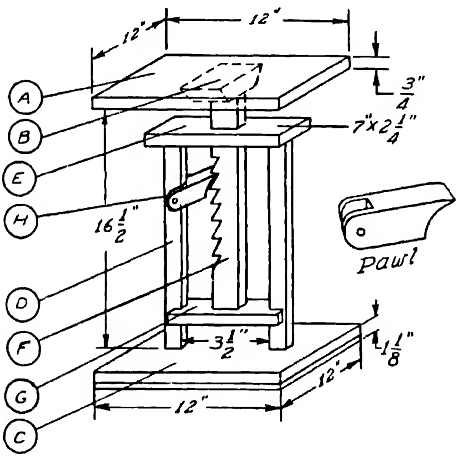


FIG. 38. Ratchet table.

After the open mortise in the top crosspiece (*E*) is cut to permit a sliding fit of the ratchet leg (*F*), teeth are cut in the latter, and its pawl (*H*) whittled and mortised, as shown in Figure 4.9. In commencing the assembly, the ratchet leg is first attached to the cleat (*B*) to which the table top (*A*) is screwed, then to its foot (*G*), before the uprights (*D*) are tried for fit and secured to their base (*C*) and the upper crosspiece or bridge (*E*). The pawl (*H*) is attached in place with a copper nail or bronze screw.

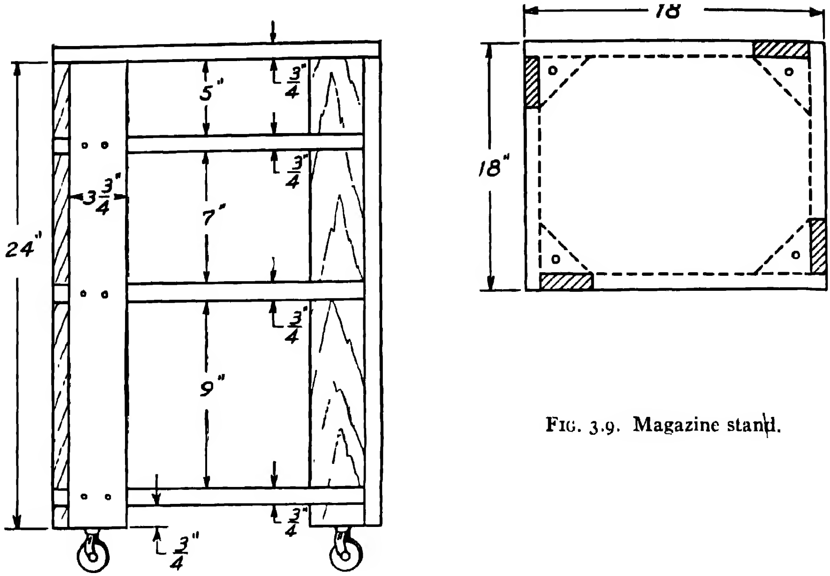


FIG. 3.9. Magazine stand.

Magazine Stand. A handy movable porch table (Figure 3.9) for holding magazines, books, or tea things can be quickly knocked together out of scrap lumber or plywood.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2–3	¾	6–9	18	Top (18 in. wide)
6–9	¾	6–9	18	Shelves and bottom (17 in. wide)
4	¾	3¾	24	Uprights
1	¾	3¾	7½	Corner blocks (4)

The shelves and top can be either glued up or cleated together near the ends, after which the uprights are screwed in place as pictured in Figure 3.9. Four corner blocks are sawed out, and after being drilled to receive the casters, are glued and screwed in place. Screw-on casters requiring no holes are preferable, since they cannot come loose.

Better practice would be to lap the uprights into the shelves and bottom. The top could then be left with an overhang, if preferred.

Flower Table. If carefully constructed and finished, the flower table with recesses for potted plants illustrated in Figure 3.10 will be a source of year-round pleasure. Such a table is especially appropriate in a glassed-in porch where the

sun will help to keep growing plants green all year long. The two recesses are lined with copper, having a central portion available for magazines and smoking accessories, with a handy drawer for cards and games.

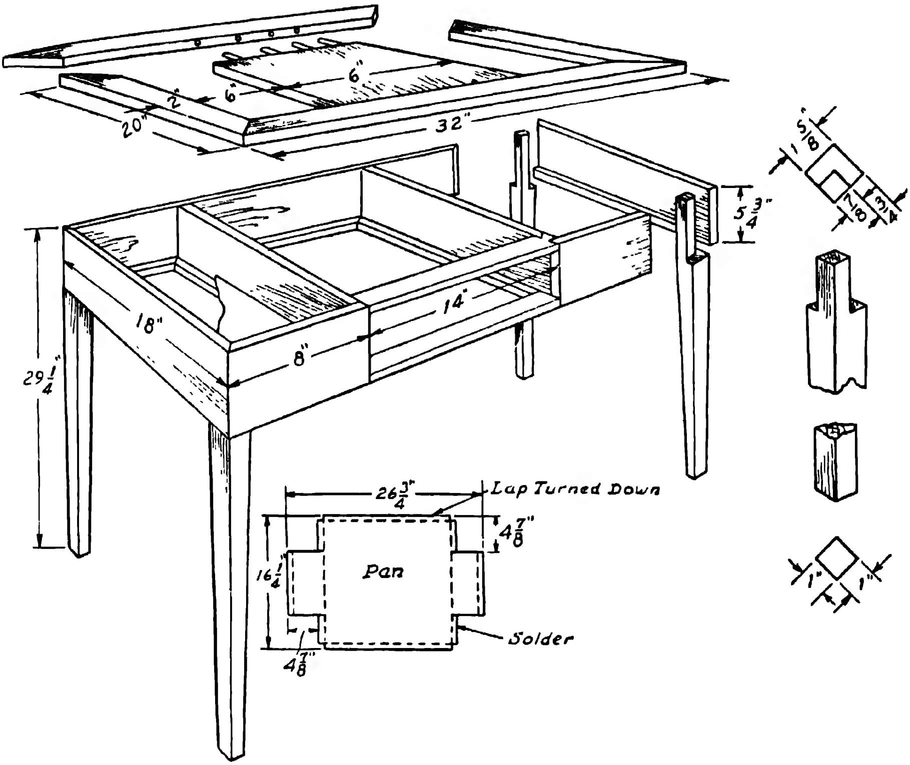


FIG. 3.10. Flower table.

The legs are styled according to the maker's personal whim, those shown in Figure 3.10 being tapered to 1 in. on four sides. The tops of all four legs have ¾-in. laps cut 5¾ in. long on the two outer sides for the aprons. The latter are mitered at the corners and screwed to the legs from the inside. The two sections of the front apron are dovetailed to the upper and drawer rails.

Before the partitions are inserted, all interior side cleats should be screwed into place. After the partitions are in position, the end cleats can be fitted and fastened. The plywood bottoms can then be bradded into the plant recesses.

Copper for the pans in the plant recesses is cut according to the detail in the drawing. This leaves a ¼-in. lap at the top to be turned down, and a ¼-in. lap at the side for soldering. Owing to the overhang of the top, the pan must be set in place before the top is fastened in position.

The top is mitered at the corners after the center section is doweled into

position to leave openings 6 in. wide to frame the plant recesses. The top can be finished nailed to the frame or fastened from below in any of the conventional methods. The drawer should be constructed 14 in. wide and 16½ in. deep.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4	1⅝	1⅝	29¼	Legs
1	¾	5¾	30	Rear apron
2	¾	5¾	18	Side aprons
2	¾	5¾	8	Front aprons
2	¾	5¾	16½	Partitions
2	¾	2½	15½	Front and drawer rails
6	¾	¾	16½	Side cleats and drawer slides
1	¾	¾	12½	Drawer end cleat
4	¾	¾	5	End cleats
2	⅜	6½	16½	Recess bottoms (plywood)
2	¾	2	32	Front edging, top
2	¾	2	20	Side edging, top
3	¾	5¼	16	Top (15¾ in. wide)

RUSTIC FURNITURE

Appropriate for gardens and terraces, as well as for week-end cabins and cottages, furniture constructed from rustic materials has retained widespread popularity throughout the years. Its rough-and-ready appearance brings to mind the hardy pioneers of America, who with the simplest of tools built their own houses, barns, fences, and furniture from materials they chopped out of the wilderness.

These same materials are at hand today, together with a selection of hand and power tools not available to those early settlers. For those who have access to lumber mills or portable sawmills where logs are cut into rough lumber, the trimmings, in the form of slabs, are easily obtainable for the construction of slab furniture. In cities, such slabs can usually be secured from fuel dealers in 4-ft lengths. Where possible, slabs should be selected that run between 3 and 6 in. in thickness and 12 in. or better in width. For the backs of chairs or benches it is well to choose a few slabs about 6 in. wide and 2 in. thick.

Saplings whose diameters run between 1 and 3 in. are required for legs, arms, and stretchers. If available, tamarack will prove an easy wood to work. Otherwise any tough wood reasonably free from knots will prove satisfactory. Since green

wood shrinks considerably, only seasoned material should be used, except when saplings are to be bent. Uniform curves in two or more saplings can be secured by bending them around wooden forms and leaving them to season for a few weeks in a warm dry place. Sometimes branches that have grown to the appropriate curves or crotches can be picked up.

In the construction of outdoor rustic furniture, oak, cypress, redwood, pine, and cedar are most satisfactory. For indoor use in a cabin, or as atmosphere in a rustic rumpus room, lighter woods can be used to advantage because their added thickness will present a sturdier appearance.

As in all furniture construction, screws are preferred to nails, which are apt to pull out. This is particularly true of flexible slats on the backs or seats of chairs or benches. The screws need not be of brass, bronze, or coated material since their ultimate rusting will blend with the bark or stained effect.

The preparation of slabs for furniture depends upon personal preferences. If the bark is left on it would appear inconsistent to plane and sand down the cut side of a slab to a commercial smoothness. Sufficient planing and sanding should be done, however, to insure comfort and remove splinters. The presence of saw marks and drawknife strokes serve to enhance the pioneer aspect of rustic furniture.

To bugproof the bark a thorough brushing with a mixture of three parts of boiled linseed oil to one part of turpentine will prove effective. Because the application of this mixture to cut surfaces will darken them, it is best to apply spar varnish to the slab tops. In fact, the best practice is to apply spar varnish not only to the raw surfaces but all over the bark, to prevent moisture from seeping in, and eventually causing the bark to loosen and peel off. Should this occur, the loose pieces can be tacked down with uncoated shingle nails.

Because of the variation that will be encountered in the available supply of logs, slabs, and saplings, few dimensions are included in the following explanations of rustic furniture construction. Suitable diameters should be selected proportionate to the strain to which the various members will be subjected, and over-all dimensions must be consistent with comfort for a person of average size.

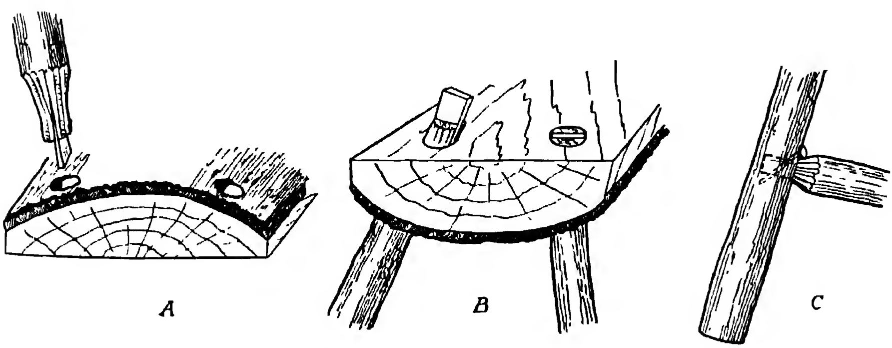


FIG. 3.11. Construction details of rustic stool.

Stools and Benches. With wide slabs for tops, rustic stools can be constructed in much the same manner as the Early American coffee table described in the previous chapter (page 81). In this case 17-in. saplings for the legs should be selected first, in order to determine the smallest diameter of the tenons. As a gage, the bark of the smallest sapling is whittled off with a drawknife to make as nearly round a tenon as possible, which will equal the diameter of an available auger bit. The latter can then be centered at the cut ends of the other three legs and turned just far enough to scribe circles as gages for whittling. The same bit can then be jigged to bore the four holes in the slab top pieces.

When relatively thick slabs and seasoned saplings are used, the leg tenons do not go all the way through the slabs, but can be fox-wedged into their holes, as shown in A, Figure 3.11. With green saplings, however, it is best to bore the holes all the way through the slabs and wedge the tenons from the top, as in B. When the wood dries and shrinks, the wedges can be driven further in or replaced with thicker ones.

Rungs and stretchers of smaller saplings are inserted into their holes in the legs before the latter are wedged into the top slabs; they can be fastened by means of nails, as illustrated in C. An optional method is to wind heavy cord, rafia, or rawhide thongs around the joint. Rawhide should be dampened and pulled tight when applied; all wound joints should be spar-varnished to protect them from the loosening effects of dampness.

By lengthening the top slab and tying the two leg assemblies together with a long central sapling as a stretcher, backless benches can be constructed to any desired dimension. To provide a back with arms, it is necessary only to add four slanting uprights to the upper surface of the slab in the same manner in which the legs were inserted. The rear uprights for the back have a sufficient rake for comfortable sitting, a back slab consisting of a thin slab double-lapped into the back of the uprights, as shown in Figure 3.12. If a curved slab is available it will be more comfortable, and a second slab can be added if desired; - both are screwed in place from the rear.

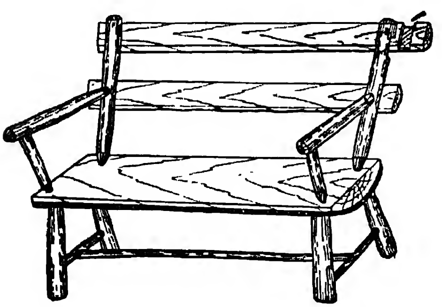


FIG. 3.12. Rustic bench.

Arms are provided in the same manner as rungs for the legs are assembled. They are added not so much for comfort as to give added support to the back. Their front ends should be beveled down and sanded.

Slab Chairs. In assembling chairs from slabs, the main consideration is to secure a slab wide enough for the seat. This should be at least 18 in. wide for

minimum comfort, and at least as long. Three such measurements will insure a satisfactory chair seat, 18 in. high, 18 in. wide, and 18 in. deep.

Inasmuch as the width is the most difficult of the measurements to obtain, slabs for seats will usually be used lengthwise, to permit additional space for the uprights forming the back. In this case the front edge must be well rounded off, as in Figure 3.13. If a suitable slab can be secured for the back, its lower end

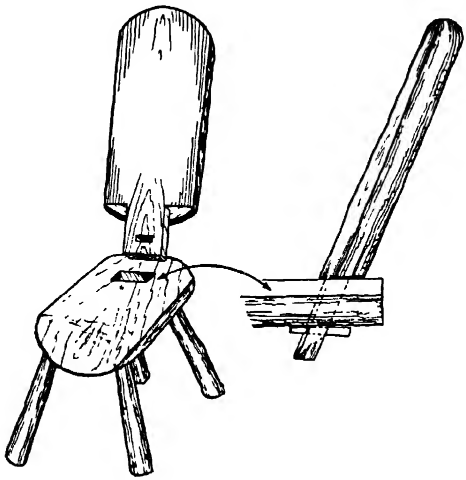


FIG. 3.13. Slab chair.

can be cut into a strong tenon that can be keyed into an incline through the miter as in A. The keyway or hole for the peg or wedge should be inclined from ⅛ to ¼ in. scant of the lower surface of the miter, so that the wedge, when driven in, will pull the shoulders of the tenon down tight against the seat's upper surface. When a wedge is used in this manner, it can be driven in deeper when necessary to compensate for a later loosening of the joint.

Other styles of slab chairs can be constructed like the bench previously described, including arms, with one or more narrow slabs screwed crosswise to the uprights, as a back.

Lounging Chair. Aside from the comfortable angles employed in assembling the main parts of the lounging chair shown in Figure 3.14, the success or comfort depends upon the careful splitting and planing of the sapling halves that make up its seat and back.

The two back "legs" are selected from saplings of approximately 3-in. diameters, cut 46 in. long. These are mounted on front legs 10 in. long whose ends are whittled into holes bored in the underside of the seat end of the back legs. Two stretchers are made by splitting a 3- or 4-in. sapling, nailing one half to

separate the rear ends of the back legs by 20 in., and the other half about 22 in. forward, as shown in Figure 3.14.

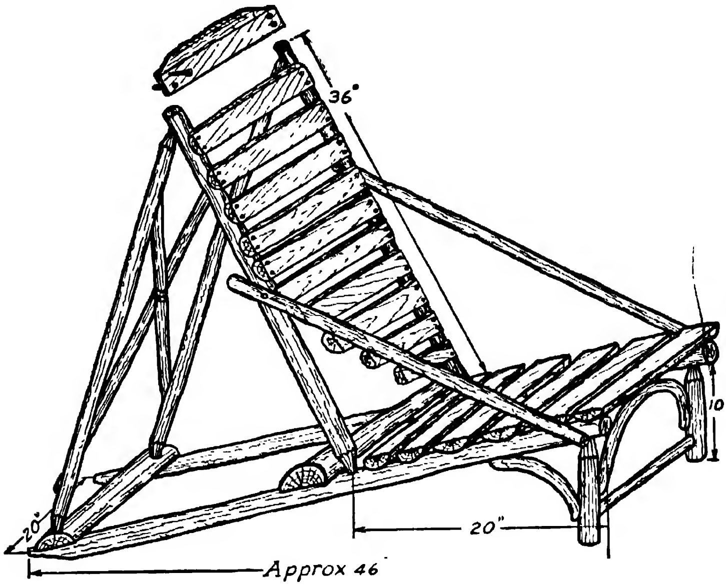


Fig. 3.14. Rustic lounging chair.

Next, two 3-in. saplings are cut 30 or 36 in. long to form the back posts, whittled and tenoned into place as indicated. They are held in place by two 2½-in. back braces whose rigidity is insured by cross braces bound by rawhide, rafia, or weaving cord, as shown.

The 2-in. arms, which serve as added strengtheners, are screwed into place at sufficient height to afford comfort to the user. The front stretcher is a sapling of about 1½-in. diameter, and the front legs are additionally secured by green saplings shaped on a form while seasoning, unless curved branches can be found to fit.

The split saplings forming seat and back may have to be notched into their supporting members to make up for individual inequalities. Every effort should be expended to insure a relatively smooth surface unless cushions are available. If this is the case, every other sapling can be omitted and only moderate attention paid to their surfacing.

Rustic Table. By using a wide slab and thicker legs about 27 in. long, the backless stool previously described can be enlarged to serve as a table. Since single slabs sufficiently wide are difficult of procurement, two or more slabs can be cradled in cleats to form a wide top, as shown in the drawing.

Such a table, however, if used on turf is apt to work into the ground and be-

come unbalanced. Recourse to the trestle type of construction pictured in Figure 3.15 will insure greater stability under outdoor conditions.

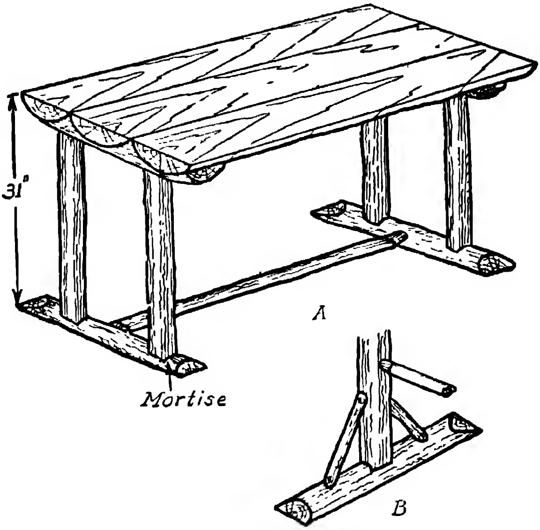


Fig. 3.15. Rustic table.

Although a top of three slabs is shown in the drawing, the number used depends on the widths available. After the cut surfaces are planed smooth, the top slabs are placed side by side, face down on a level surface. The two sections of a 4- or 5-in. sapling which has been ripped down the middle are laid smooth side down, crosswise near the ends of the slabs to serve as cleats, and their positions marked. The marks are saw-kerfed about halfway through the slabs and dadoes are chiseled out into which the cleats are firmly screwed. The smooth surfaces of the slabs will probably need to be replaned after the cleats are in place.

To this top any style legs may be fixed, depending on its width. Detail A, Figure 3.17 illustrates a double-leg trestle, which is of more stability than the single-leg trestle but of simple construction. The leg tenons can be fox-wedged, nailed, or if the sapling is thick enough, doweled into place as shown in the detail. When using a single leg for a narrower top, the stretcher can be raised well off the ground, as illustrated in detail B.

Occasional Table. A small, semirustic table (Figure 3.16) fits in well with porch furnishing and is handy for lamps, magazines, and cold drinks. By using finished lumber for the top and rails, a smooth, even surface is assured, which can be stained brown or enameled in green, black, or any preferred color.

The top is glued together and band-sawed into a circle of 30-in. diameter. Its edge is bound by a molding of split saplings bradded into place while green.

Material List

Lumber

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4–6	¾	6–9	30	Top (30-in. diameter)
4	1⅛	3	20	Rails

Saplings

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4	2	—	32	Legs
4	1	—	21	Stretchers
4	½	—	16	Outside braces (curved)
4	½	—	14	Inside braces
—	¾	—	96	Table-top molding

If an alternate, octagonal, or hexagonal shape is preferred, separate pieces of seasoned molding can be mitered into position without bending.

The rails are double-lapped as indicated in Figure 3.16, with 1-in. holes bored through their 12-in. centers to receive the long tenons at the upper ends of the legs.

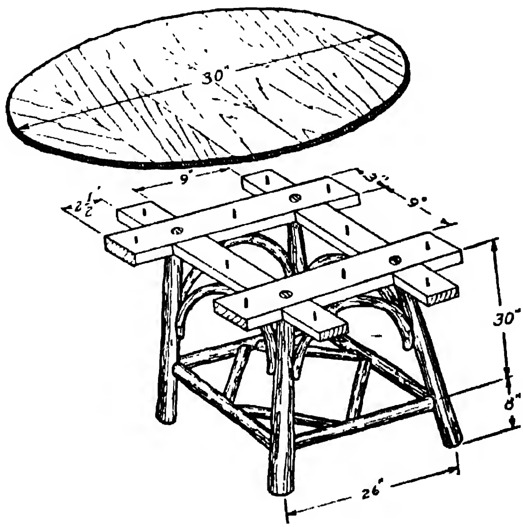


Fig. 3.16. Occasional table.

The latter have holes bored 8 in. up from their feet to house the tenoned ends of the stretchers.

Saw kerfs are cut down the leg tenons, and when the stretchers are inserted between each pair of legs, the tenons of one leg assembly of two legs and stretcher can then be inserted into the holes in the rails and the legs adjusted for equal slant in two directions, as explained under the construction of the Early American coffee table in Chapter 2 (page 82). Wedges are then driven in and the other leg assembly adjusted into its miters, after the two additional side stretchers have been inserted into their recesses. Waterproof resin glue can be used as additional security at these joints, with screws through the legs into the stretchers. The protruding lengths of leg tenons are sawed off flush with the upper surfaces of the rails.

The inside diagonal braces are mitered and bradded into place, and the top screwed to the rails from the underside. The curved outside braces are bradded into position last.

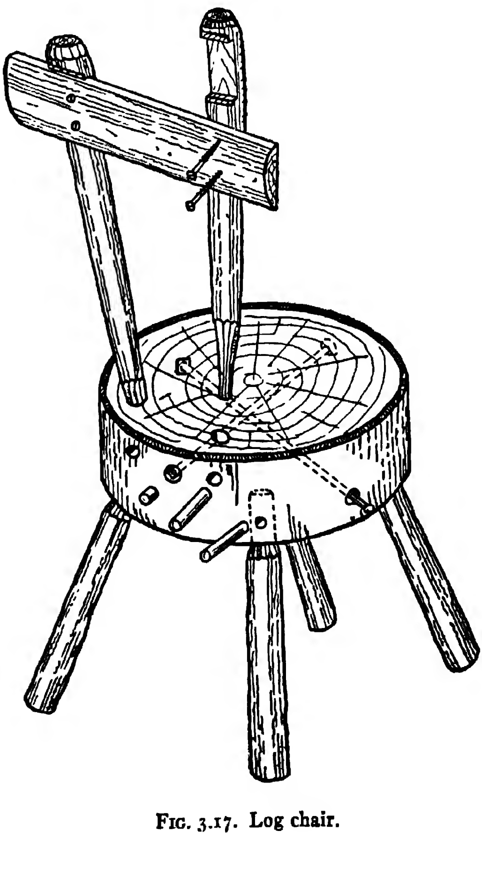


FIG. 3.17. Log chair.

LOG FURNITURE

When the rustic-furniture builder has access to whole logs, a more massive type of construction can be effected with split logs for benches and table tops, in place of the thinner slabs. The only change in the methods of assembly which is advisable with these thicker lengths of material is the use of lateral dowels from the side, as illustrated in the detail in Figure 3.17. The more meticulous cabinet-maker who wishes to conceal the heads of his dowels or screws can cut off or bend back a small section of bark over the proposed hole, gluing or bradding it back into place after the dowel or lag screw has been driven home.

Cross sections of logs can also be used to advantage for chair seats. Figure 3.17 shows a simple type of chair with such a seat. Because the extreme susceptibility of end grain to cracking and splitting is intensified by exposure to weather, the cross section used as the seat should be reinforced by ¼-in. iron bolts or long ⅜-in. dowels, inserted as shown in the drawing.

This operation requires the use of a shipwright's auger or long bit for boring the holes completely through the log. If these are not available, a short bit can be welded to a steel rod whose end has been hammered to a tapered square to fit into the chuck of a brace. When iron rod bolts are used, the large counterbores required for the nuts and heads can be plugged. The end grain of the seat should be protected with a good grade of spar varnish.

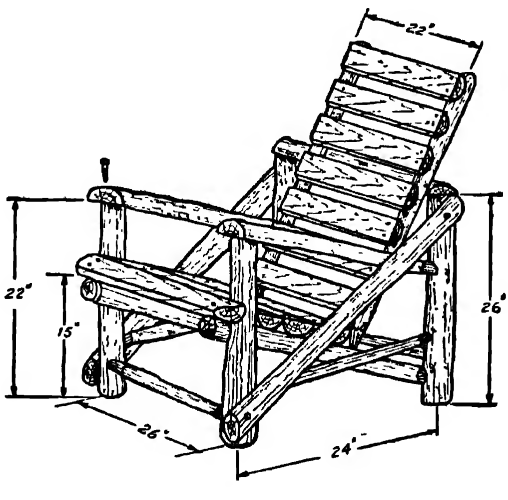


FIG. 3.18. Log armchair.

Armchair. Reminiscent of the type of construction used in building the chairs of the tête-à-tête ensemble (page 201), the sturdy armchair pictured in Figure 3.18 makes use of light logs or heavy saplings for its four legs and outside diagonal

braces. The latter are lapped into the upper ends of the back legs and into the lower ends of the front legs and spiked or bolted into place.

The two side stretchers are tenoned into position, after which the inside diagonal saplings comprising the seat are lapped and fastened to the uprights. The arms are tenoned into the back posts and screwed to the tops of the front legs, as indicated.

The two side assemblies can now be joined at the rear by a sapling stretcher near the bottoms, followed by a split log or sapling spiked across the tops of the rear posts or legs. The front stretchers are now added.

The chair back can be assembled separately and set in place before the seat slats are added. Tenons are whittled at the bottom end of the two saplings that form the uprights for the reclining back, fitted lightly into holes bored in the seat rails and removed before attaching the split sapling slats. When the back is in place the seat slats are added with the front one well beveled and rounded on its forward edge.

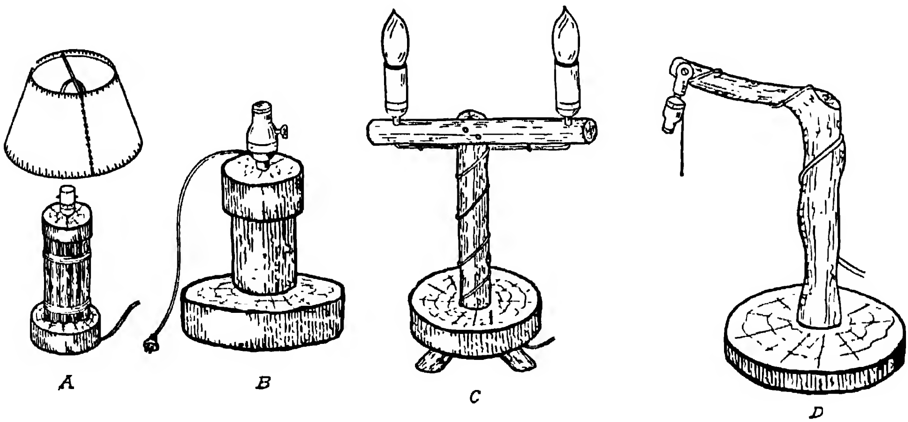


FIG. 3.19. Rustic lamps.

Lamps. For the week-end cabin or cellar rumpus room equipped with rustic furniture and accessories, the rugged atmosphere can be enhanced by lamps made up of sections of logs and saplings (Figure 3.19). By inserting the fixtures described in the previous chapter, these rustic fixtures can be endowed with the modern convenience of electricity, without sacrificing their pioneer appearance.

Perhaps the simplest form of table lamp can be assembled from a handful of saplings bound together with rawhide, similar to the bamboo lamp described in Chapter 2 (page 173). Cross sections of small logs can be used as the cap and base of the lamp, with the latter dadoed out laterally for the wire that passes through the tubing in the center, as shown in A of Figure 4.21. If birch bark is available, a lampshade can be cut to a paper pattern and glued and screwed together over a suitable wire form.

The problem of drilling a solid section of sapling to receive the lamp cord is identical with other types of lamps. The improvised auger described under log furniture (page 216) can be used if the sapling selected is not of too small a diameter. Otherwise it is well to lead the wire off directly from the socket, which is screwed to a ⅛-in nipple imbedded in the top of the lamp column. Simple grouping of a section of log with a suitable upright member is shown in B.

A pair of candle-lamp fixtures can be mounted on a crossarm based in a cross section of a log as in detail C. Since electrification of such a candleholder is an anachronism at best, it is just as well to wind the wire boldly around the center column and lead if off to its outlet without further subterfuge.

A search through the woods will yield interesting branch formations that can be tenoned into a base without further carpentering. In detail D of Figure 3.21 one example is pictured, where a hanging fixture (see page 178) drops gracefully from the horizontal branch. If the lamp is to be used in a corner or next to a wall, a dark brown electrical cord can be stapled to the "blind" side and led out through the base.

Bridge lamps can be constructed in much the same manner. Either a solid base cut from a large diameter log can be used, or three short saplings can be used as legs, similar in treatment to the candle-type lamp illustrated in C. The sapling arm can be lapped or doweled into place and the electric fixture either hung from below as in C, or screwed upright to a nipple forced into the upper surface of the arm.

Here again, a natural growth can be selected and used to excellent advantage For a wire of this length it will prove more satisfactory in the long run to fasten it along the arm and down the upright with loops of rawhide or rafia, so that there will be no insecurity when the lamp is moved about.

BARBEQUE ACCESSORIES

The backyard barbeque with its brick or stone fireplace, or portable metal charcoal stove, has become a firmly intrenched institution among many home-owners. Its universal popularity stems primarily from the picnic urge that periodically galvanizes the average family. In addition it affords an ideal pattern for informal entertaining, and provides an outlet for the suppressed desires of the male sex to display their rough-and-ready culinary skills.

The growing cult of amateur barbecue addicts is glibly conversant with all manner of gadgets, devices, and sauces. While certain accessories achieve distinctive characteristics, the average so-called "barbeque furniture" is equally useful for general recreational purposes, including the rumpus room. Since the primary objective of barbeque "fiestas" is eating, it is proposed to describe various forms of tables that are proving popular for the consumption of whatever viands emerge from the barbeque spit or oven.

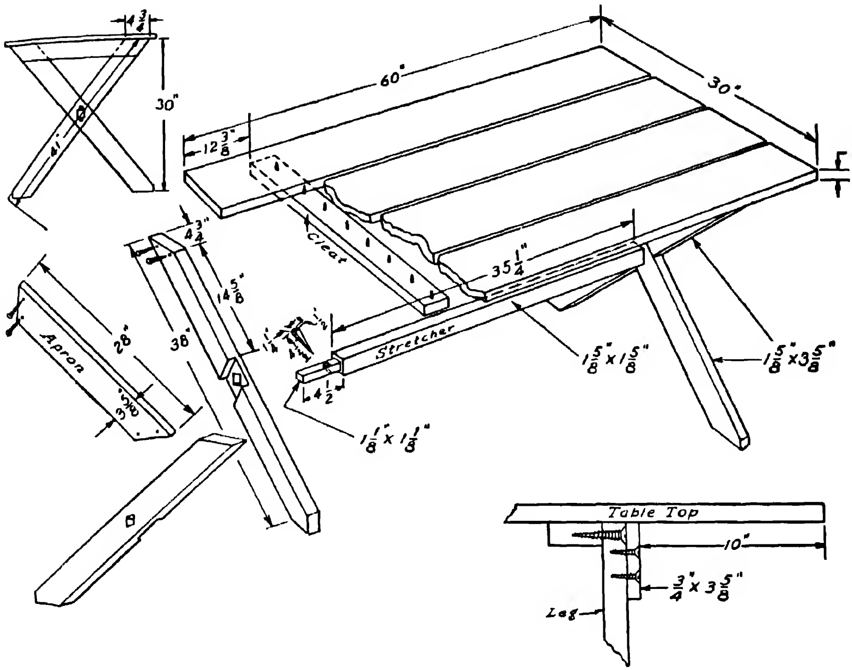


FIG. 3.20. Sawbuck table.

Sawbuck Table. Directly descended from Colonial ancestors, the sawbuck table (Figure 3.20) is an ideal subject for an outdoor project. Its legs and cleats are standard 2 in. × 4 in. stock and its stretcher cut from a length of 2 in. × 2 in. material. The top is composed of ⅞-in. boards for heavy duty, spaced 3/16 apart to drain off rain. If preferred, the top boards can be butted tightly against each other and covered with linoleum.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4	⅞	7	60	Top (30 in. wide)
2	1⅝	3⅝	28	Cleats
4	1⅝	3⅝	41	Legs
2	¾	3⅝	28	Aprons
1	1⅝	1⅝	44¼	Stretcher
1	½	1¼	4½	Drawbore pins (2)

The two cleats are screwed crosswise to the underside of the top 12⅜ in. from each end, with an overhang of 1 in. on both sides. The legs are then laid out to a length of 38 in., as shown in Figure 3.20. When properly marked with a steel square, it will be found that their ends will measure 4¾ in. and that when double-lapped in the center, the upper V of the joint comes 14⅝ in. down from the top edges of the legs.

Mortises are cut for the tenoned ends of the stretchers, and two wedges or drawbore pins cut from a piece of hardwood ½ in. thick. The tenons are tried for a tight fit in their mortises in the lapped joints of the legs, and the mortises for the drawbore pins marked out. These mortises should slant to the rear so that their back surfaces are ¼ in. deeper than the outside surface of the lapped leg. This draws the cheek of the tenon tightly against the leg, allowing for future wear and tear.

The legs can now be nailed against the outside faces of the cleats. For additional strength the two aprons are screwed to the legs after their edges are cut to coincide with the latters' diagonal slant.

Matching benches can be made by reducing the dimensions. The seats can be as narrow as 14 in., but should not be higher than 18 in. It will be noted that the table has an overhang of 10 in. at the ends, permitting the use of short benches or other available seats at the ends, when required.

An optional method of construction would be to make the table top slightly longer, placing the cleats near the ends so that the legs could be hinged to fold inward for storage, once the drawbore pins and stretcher were removed.

Lazy Susan Table. The term "Lazy Susan" or "Lazy Betsy" conjures up a picture of an old-fashioned dining table accessory in the form of a circular condiment tray, pivoted at the center so that guests could select their favorite seasonings at will. The idea was also applied to a circular dining table that enjoyed limited popularity in bygone years.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
6–10	⅞	6–10	60	Table top (60 in. diameter)
4– 9	¾	4– 9	36	Turntable (36 in. diameter)
4	¾	1⅝	18–36	Cleats
4	3⅝	3⅝	29	Legs
4	¾	7¾	39¼	Aprons
2	1⅝	3⅝	56	Crosspieces
1	3⅝	3⅝	6	Center post

Resurrected as an outdoor dining table it is a boon to the busy barbeque host or picnic hostess, where self-service is the order of the day. When fitted with an old automobile king bolt and thrust bearings, the rotating member will render excellent service. A discarded carriage wheel and axle over which is attached a plywood disk cut out to fit over the hub, makes another efficient Lazy Susan. Failing these, a simple spindle and housing as shown in detail A of Figure 3.21 can be assembled by any plumber or local mechanic.

The dimensions given will permit from eight to ten people to be seated, with ample storage on the turntable for main and supplementary dishes.

The table frame can be constructed with 4 in. × 4 in. legs held together with

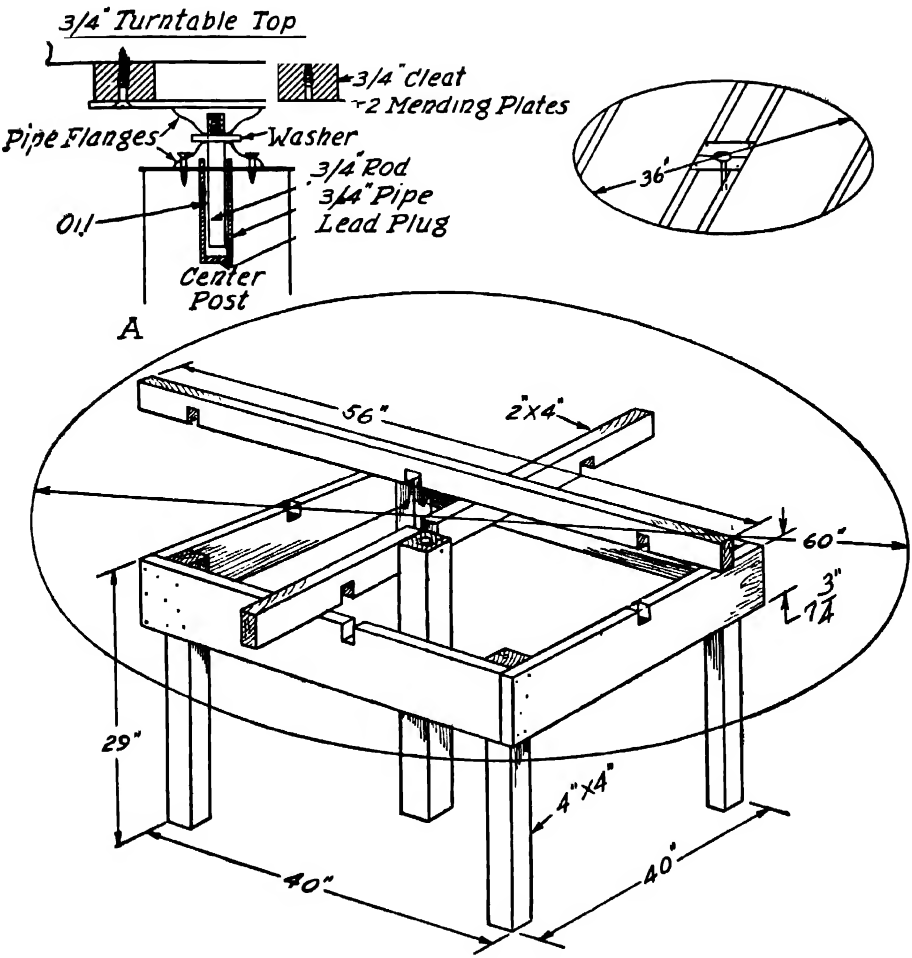


FIG. 3.21. Lazy Susan table.

butt-jointed aprons about 7¾ inches wide. Wider aprons may have to be cut narrower near their centers to allow knee space.

The 2 in. × 4 in. crosspieces are double-notched to the aprons and near their centers in such a way that a block or post can be fastened in the center of the table to two adjacent crosspieces. If the table is to remain semifixed it would be well to extend this center block to the ground, as a fifth leg for better support of the axle housing of the turntable or Lazy Susan.

The main table top can be fastened to the aprons and crosspieces with openings for drainage between the boards if desired, after the latter have been temporarily clamped together and sawed into a circle with a 5-ft. diameter, or any other shaped top. The turntable can be permanently cleated together and sawed into a circle whose diameter is 3 ft. Waterproof plywood can be used for both table tops if preferred.

As shown in detail A, the axle housing consists of a 4- or 5-in. length of ¾-in. iron pipe sunk into the center block or support, surmounted by a pipe flange screwed to the top of the center post. The axle itself can be cut from a length of ¾-in. rod, threaded to screw into a pipe flange at the top, which is separated from the lower one by one or more washers. The top flange is welded to two iron mending plates that are welded along their inner edges and screwed to the two center cleats of the turntable as shown, or a single piece of iron or steel can be used if available. If at some later date the turntable develops a list, four casters can be screwed to its underside, or inserted into the opposite ends of cleats to level up the Lazy Susan. If the dimensions of the table are increased to provide space for from twelve to sixteen people, six or eight casters will be necessary to insure smooth rotary action for the turntable when it becomes overloaded on one side. In computing the minimum space per person, at least 18 in. × 18 in. should be allowed—but the wider the more comfortable.

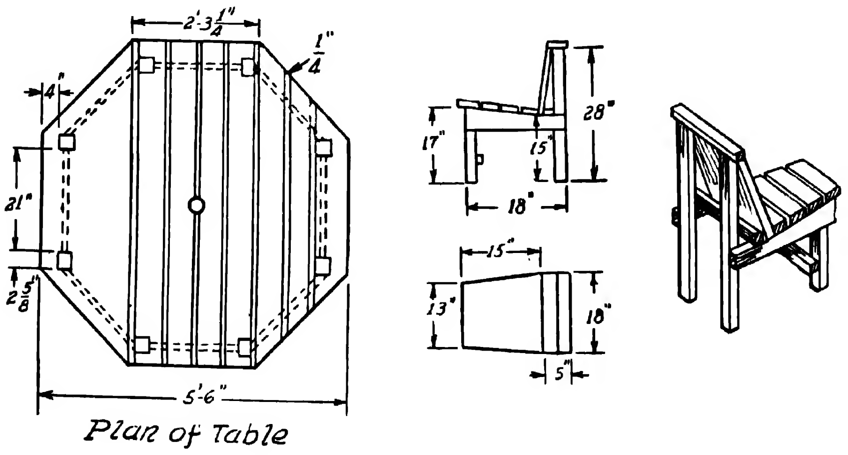


FIG. 3.22. Octagonal table and chairs.

Octagonal Table Set. An outdoor table seating eight people under an umbrella can have its chairs constructed with tapered seats so that they can be pushed under the table top when not in use. (Figure 3.22). Top and seats are fastened together with ¼-in. drainage slits so that they can be left outdoors in all weathers.

Lumber List

Table

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
8	2⅝	2⅝	29¼	Legs
8	¾	4¾	20⅜	Aprons
11	⅞	5¾	66	Top

Chair

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	1⅝	1⅝	28	Back legs
2	1⅝	1⅝	17	Front legs
2	¾	4	18	Side rails
1	¾	1⅝	13	Front stretcher
1	¾	1⅜	18	Back cleat
1	¾	18	12½	Back (plywood)
1	¾	3	18	Top rail
4	¾	3½	13–18	Seat slats

To assemble the table it is best to cut one half of a paper pattern so that the mitering or doweling of the aprons into the legs can be accurately measured, as in the diagram in Figure 3.22. It will be found that the aprons will vary in length, somewhat, due to the squareness of the legs. Since the table top is fastened with a 4-in. overhang, these variations are of little consequence. The boards of the table top are fastened ¼ in. apart, as indicated.

The chairs are reduced copies of the type of construction used in the tête-à-tête ensemble (page 201). The backs can be of single pieces of ¾-in. waterproof plywood. As will be noted in the drawing, the seats taper to 13 in. at their fronts so that they will fit underneath the table when not in use.

Triangular Tray Stand. If large brass or aluminum circular trays are part of the household equipment, it is easy to knock together one or more triangular stands on casters that will render useful service as tea tables, miniature buffets,

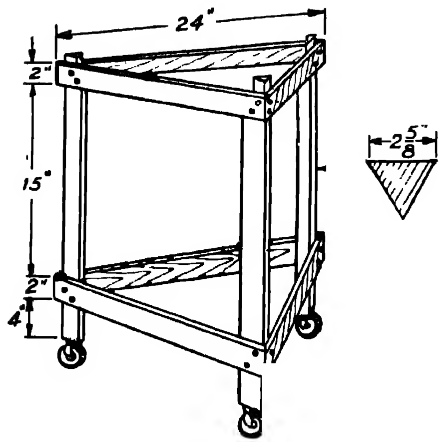


FIG. 3.23. Triangular tray stand.

snack bars à deux, or smoking stands. Lacking such trays, one or more pieces of ½- to ¾-in. plywood can be cut into circles whose edges can be bound with chromium or plastic edging. In place of linoleum, the upper surfaces of these plywood trays can be covered with acid- and alcohol-resistant formica or Micarta.

The dimensions given below are based on a removable tray of 26-in. diameter. So long as the triangle remains equilateral, the measurements can be varied to suit any size of tray top.

The legs are ripped into triangles having upper projections 1 in. long. The elementary construction pictured in Figure 3.23 is devoid of dowels or mortise and tenons for aprons and dowels. Additional shelf space can be provided by adding a set of cleats halfway up from the stretchers for a triangular piece of plywood. Holes drilled into the bottoms of the legs for casters insure convenient mobility on a porch floor. The stands are no less valuable aids to serving when set on turf, without casters.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	2⅝	2⅝	24	3 Legs (ripped)
6	½	2	24	3 Stretchers and aprons

Stake Table. When tables or chair arms are at a premium for outdoor eating, a handy aid to comfortable picnicking is the one-legged stake table pictured in Figure 3.24. When driven into soft ground or sandy beach, the single leg will offer sufficient stability to support a moderate meal on the ¾-in. plywood top.

The length of the stake is determined by the softness of the ground or beach, and the anticipated position of its user, that is, whether sitting on a chair or seated on the ground. The threaded pipe flange screwed to the underside of the table makes it easy to unscrew the threaded end of the pipe or rod stake, for transportation or storage. Several of these tables can be stored in a minimum

space, such as a compartment in the barbeque fireplace, and when spring clips are screwed to the underside, can be carried complete with stake.

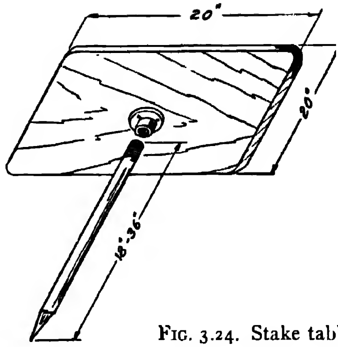


Fig. 3.24. Stake table.

Palette Plates. Another form of assistance to participants of lap suppers or informal outdoor and indoor snacks is a form of plate designed like an artist's palette. The studio arm type shown in Figure 3.25 is one of the handiest, and the oblong type the easiest to construct.

Band-sawed from 1-in. material which is easy to work, two or three depressions can be scooped out with chisels, carving tools or a drill press to form recesses for the various types of food.

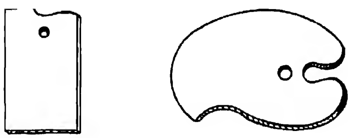


Fig. 3.25. Palette plate.

An efficient cup holder is a section of a tin can which has been cut off and screwed to the palette to hold a cup. The cut off edges should be slit and turned down for ¼ in. to avoid sharpness; the size, including depth and position of the handle slot, is determined by the style of cup that will be used. For glasses whose bottoms are smaller than their rims, a circular hole can be cut into which the glass will fit midway.

ROLLABOUT FURNITURE

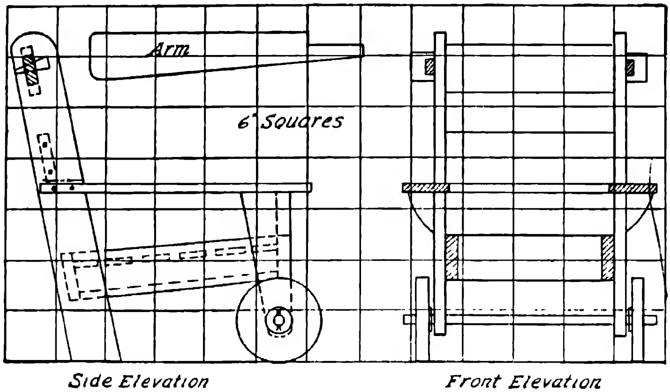
Because most outdoor furniture is left outside for the season, it is often constructed on rather massive lines. To compensate for this added weight and consequent lack of mobility, wheels are often provided at one end so that the piece can be moved about readily, like a wheelbarrow.

The heavier types employ wheels cut from 2-in. material mounted on hardwood or iron axles with suitable washers. Wooden wedges or dowel pegs can be used to keep the wheels from rotating off the ends of their wooden axles; nuts threaded to the iron axles perform the same function. Wooden axles offer less friction if impregnated in hot paraffin.

For medium-weight furniture, ½-in. lag screws can be driven through the wheels as axles; plywood disks can be added to cover the countersunk head of the screws.

Unless laminated construction is employed it is advisable to screw small cleats crosswise, above and below the axle on the inside of solid disk wheels. Laminated members, when properly constructed, are usually more uniform in strength and less apt to change with variations in moisture content. In contrast to the crossbands in plywood, the grain in all the layers runs parallel, instead of at an angle

to its neighbor. Disks or laminations of the same species of wood, or of different species that have the same shrinkage characteristics, of all flat-grained material with the same moisture content, when glued-up with waterproof glue will exhibit a minimum tendency to change shape.



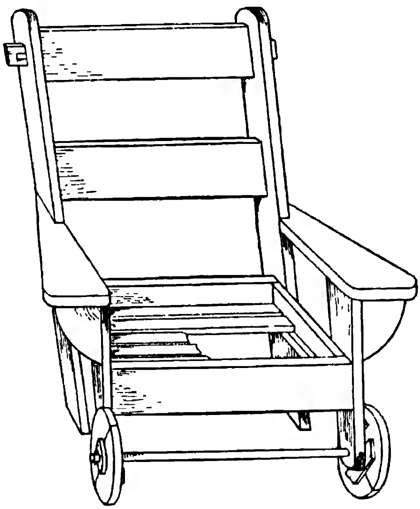


FIG. 3.26. Wheeled chair.

Wheeled Chair. A massive chair, built of standard 2 in. × 6 in. timbers stained brown, can be made easy to move about by the addition of wheels to the front legs. By locating the wheels in the front, the possibility of sliding or tipping over backward is eliminated. Waterproof cushions of sponge rubber set on the slats of the seat and against the horizontal rails, will render this chair a comfortable spot to while away the outdoor hours.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	1⅝	5⅝	39	Back legs
2	1⅝	5⅝	17	Front legs
2	1⅝	5⅝	24	Side rails
2	1⅝	5⅝	20	Front and back rails
1	1⅝	5⅝	28¼	Back top rail
1	1⅝	5⅝	20	Back bottom rail
2	1⅝	5⅝	32½	Arms
2	1⅝	2¾	5	Arm supports
2	¾	3	24	Seat cleats
6	¾	3	16¾	Seat slats
4	1⅝	5⅝	10½	Wheels (2)

The curved back, arms, and triangular front legs can be band-sawed as indicated in Figure 3.26, or sawed out with a handsaw if left angular. Tenons can then be cut in the ends of the back upper rail with corresponding mortises in the top of the back legs. Undercut mortises are cut in the tenons to receive the wedges, as explained in describing the sawbuck table (page 219).

The seat frame is butt-jointed together with the front rail slanted to conform to the vertical edges of the front legs. The seat cleats can then be screwed in place 2 in. down from the top edges of the side rails, and the seat frame spiked or screwed in position from the inside, or bolted from the outside.

The back top rail is now slid into its mortise and the back lower rail fastened into position. The wedges can then be driven into their mortises to hold the back of the chair together. The slats are screwed in place at approximately 1³⁄₁₆-in. intervals

The wheels are made from two sections of 2 in. × 6 in. stock cleated together on the inside faces and band-sawed into disks of 10½-in. diameters. A ¾-in. solid rod or iron pipe can be used for an axle, with holes bored near the ends for cotter pins to keep the wheels from rolling off. Disks cut from ¼-in. plywood are attached with waterproof glue and screwed to both sides of the wheels as fixed washers. The inside disks should be large enough to span the cleats. Fiber washers are added to prevent undue friction.

At the expenditure of a little more effort in joinery, the side rails can be tenoned in place flush with the front and back legs. This will present a more finished appearance and increase the length of the seat slats.

Rolling Lounge. A companion piece to the wheeled chair is the comfortable mobile lounge with its adjustable backrest (Figure 3.27). The dimensions given

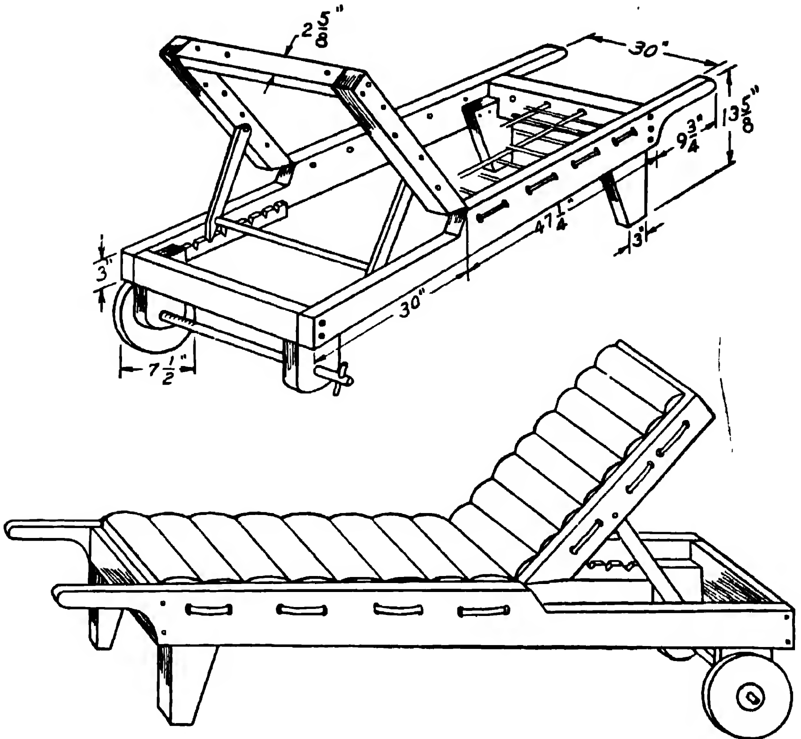


Fig. 3.27. Rolling lounge.

will fit the standard cot-size or channel mattress that can be covered with waterproof fabric. Quarter-inch rope is woven through holes in the sides of the frame to form the "springs."

Lumber List

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	1 5/8	5 5/8	87	Sides
2	1 5/8	5 5/8	30	Ends
2	1 5/8	5 5/8	11 1/4	Legs
2	1 5/8	5 5/8	10	Axle housings
2	3/4	2	15	Backrest supports
1	5/8	—	29 1/2	Support spreader
2	3/4	2 1/2	23	Notched cleats
2	1 5/8	7 1/2	7 1/2	Wheels
1	1	—	37	Axle

Before the box frame is knocked together, the backrest end is ripped as shown in Figure 3.27, so that the backrest member, 2⅝ in. wide, can be attached by strap hinges to the upper edge of the frame.

The front legs and axle housings are screwed to the inside corners of the frame 2⅜ in. down from the top edge to allow for the rope springs. The latter is woven through holes bored approximately 5 in. apart around the frame, as indicated in the drawing.

The backrest supports are separated 2½ in. from their triangularly sawed pawl ends, by a ¾-in. dowel, and are bolted to the insides of the backrest frame as shown. A washer should separate the inside surfaces of the supports from the frame, to provide easy movement.

As indicated in the introduction to this section, the wooden wheels may be of various types of construction. To conform to the material of the framework of the lounge, the wheels in this case are cut from 1⅝-in. stock with a ¾-in. reinforcing piece lapped to the inside face.

The axle can be an iron or brass rod or pipe, threaded for nuts at both ends, or pierced for a cotter pin near the ends. If a 1-in. dowel is used, it should be drilled near the outer ends for a ¼-in. dowel to hold the wheels on. In place of metal washers, large disks of ¼-in. plywood can be used; the outside one when bradded to the outer face of the wheel adds to the decorative effect.

Mobile Bar. Designed for the serving of liquid refreshment from long bottles, the roving cellarette shown in Figure 3.28 can also deliver tea, coffee, sandwiches,

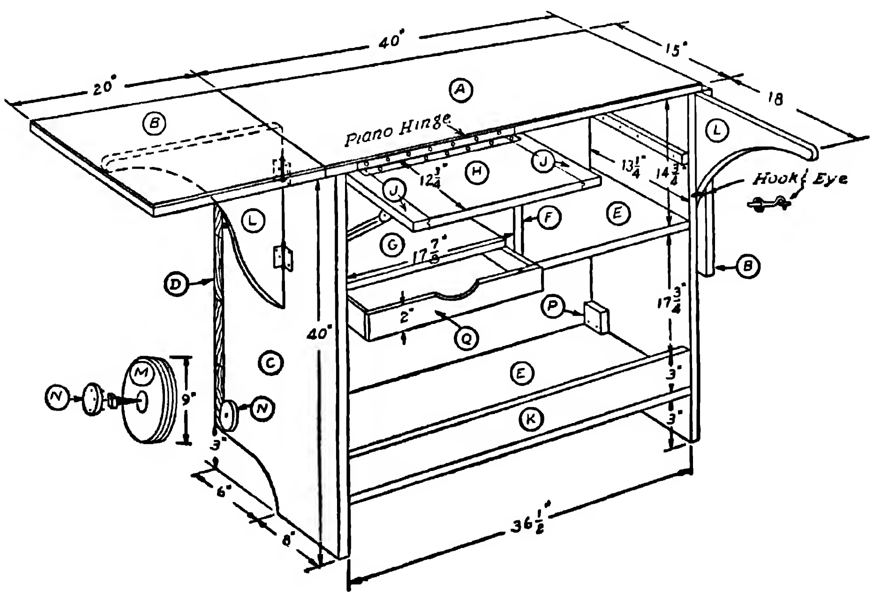


FIG. 3.28. Mobile bar.

or chafing dish meals on the spot. Its pushcart handles when unhooked will do duty as supports for the side leaves, creating a sturdy serving surface 5 ft. long.

The left-hand upper compartment lid hinges up as a shelf for cutting fruit or making sandwiches. Beneath is a shallow drawer for bar spoons, jiggers, sugar, or silverware. The right-hand compartment is ideal for storing an ice-cube container, chafing dish, or, with a shelf astride the cleats, dishes and cups. Tall bottles, tea or coffee containers, sandwich materials, or more dishes can be accommodated in the long, bottom recess.

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
(*A*) 2	¾	7½	40	Top (15 in. wide)
(*B*) 4	¾	7½	20	Leaves (2)
(*C*) 4	¾	6⅝	40	Sides (13¼ in. wide)
(*D*) 4	¾	8⅝	38	Front (37 in. high)
(*E*) 4	¾	6⅝	36½	Bottom and shelf (13¼ in. wide)
(*F*) 2	¾	6⅝	14¾	Partition
(*G*) 2	¾	6¼	17⅞	Compartment bottom (12½ in. wide)
(*H*) 2	¾	6¼	15⅜	Compartment lid
(*J*) 2	¾	1¼	12½	Lid cleats
(*K*) 1	¾	3	36½	Fiddle
(*L*) 4–6	¾	6–9	8–18	Handle supports (18 in. wide)
(*M*) 6	½	9	9	Wheels (3 laminations)
(*N*) 4	¼	3	3	Disks (plywood)
(*P*) 2	1⅛	4	4	Blocks
(*Q*) 1	2	17⅞	13¼	Drawer

The top, leaves, sides, handle supports, bottoms, shelves, and partition are glued and set aside to dry while the material for the wheels is glued together with waterproof resin glue. The grain of the three ½-in. laminations for each wheel runs in the same direction and tight clamps must be applied so that all surfaces are in close contact.

When dry, the offsets for the wheels are cut out of the front of the sides as indicated in Figure 3.28. It will prove easier to attach the butt hinges of the leaves of the top before the latter is screwed to the tops of the sides. The bottom and center shelf can then be fastened in place and the front screwed on. Next the partition and compartment bottom are added.

The handle supports are cut out as shown, and butt-hinged to the sides so that they firmly support the leaves, when open. Short hooks and eyes are screwed

in place as indicated in the drawing, to prevent the handles opening when the cellarette is in motion. The shallow drawer is of normal construction, without slides or guides.

The laminated blocks can be band-sawed into wheels of 9-in. diameter when thoroughly dry. Instead of using an axle, a 3-in. lag screw is let into the outside lamination of each wheel and turned into the sides of the bar. As indicated in the drawing, a 1⅛-in. block is screwed into each of the inside corners to take these lag screw axles. Hardwood plywood disks are cut to fit over the heads of the lag screws and act as washers.

BARREL FURNITURE

Barrels are of several kinds although of similar size. For the purposes of this section, however, only the variety employed as liquid containers will be considered. Constructed of thick staves topped by metal hoops, this rugged type of barrel is better fitted to withstand the stresses and strains to which furniture is subjected, than the lighter types, coopered with wooden hoops.

For long service it will prove good practice to drill the metal hoops of barrel furniture at intervals, and secure them to their staves with cooper nails, clinched inside. If the inside is to be exposed, shorter nails can be used, or brass screws employed. With this added security, it is not necessary that the bottoms be headed; in fact, when used outdoors, the rims will sink firmly into the turf if the heads are missing.

A very satisfactory method of finishing barrel furniture is to bleach the staves to their natural color with repeated washes of oxalic acid. After the last application has been thoroughly removed with plenty of clean water and dried, spar varnish will protect the natural graining from the elements. The uses of fillers and stains is discussed in Chapter 6. The iron bands can be painted black, after a coat of red lead has been applied, unless copper or brass banding is available as a dressier substitute. For outdoor use it may prove preferable to paint barrel furniture white, green, or a combination of bright colors.

Table and Stools. Heavy boards, cleated together underneath and band-sawed into a circle with a 4- or 5-ft diameter can be bolted or spiked to the head of a standard-sized 55-gal. barrel, 33 in. high and approximately 21 in. in diameter at its ends, to form a heavy pedestal table that can endure considerable abuse.

For seats, nail kegs make excellent stools. Their tops can be upholstered with layers of hair and cotton, covered by a waterproof fabric tacked over a muslin liner. The keg stools, when finished to match the table, can be pushed out of the way under its wide overhang.

Cocktail Table. A pickle or vinegar keg that averages 21 in. high with a 14-in diameter at the head end makes an excellent pedestal for a cocktail table. The table top can be of ¾-in. plywood with a veneer edge 2 in. wide and linoleum

the inside of the barrel. The old barrel top will loosely fit these supports, requiring considerable padding to fill up the gaps.

A more workmanlike and substantial support requires the sawing of a curved cleat that is screwed to each stave from the outside, 1 in. below the cutout, seat portion of the barrel. When the distance to the bottom end of the backrest has been determined, a cardboard templet should be cut and applied to a 2-ft. square piece of 1-in. stock or plywood, which is cut out as shown in B. If the rear curve for the backrest is cut at an angle, it will facilitate nailing or screwing the bottom ends of the backrest after the cleat is in place. As shown in detail C, a board is nailed under the rear portion of the cleat as a stop for the ends of the backrest staves. For additional security an upright piece of 2 × 2 or 2 × 4 rests on the bottom of the barrel to support the board and its cleat.

The center waste of the material used to cut out the curved cleat can be used for the seat, inasmuch as the padding will take up the 1¼-in. thickness of the cleat. The seat may be left removable, in which case the padding of the back will be greatly facilitated. A thick layer of stuffing is well distributed over the wooden seat, including the front edge, and is covered with burlap tacked to the underside. Next a layer of cotton batting is applied, so that it, too, covers the front edge. This in turn is smoothly covered by muslin, also tacked to the underside of the seat, followed by the fabric covering, preferably of a waterproof nature. The back can be covered in much the same way and tufted, by inserting upholstery tacks at alternate intervals. A channeled back is explained in Chapter 7.

METAL FURNITURE

Metal furniture lends itself to outdoor usage because of its year-round, weather-resistant properties. Although customarily fabricated with welded joints, the examples that are described in the following pages can be assembled with the tools in the average home craftsman's kit, which may be presumed to include a hacksaw and a bit for drilling holes in metal.

The popular aluminum tubing is prescribed for either or both tables and one of the chairs. The other chair will require a stronger medium, such as ½-in. electric conduit. The latter's basic rigidity makes it suitable for all types of metal furniture.

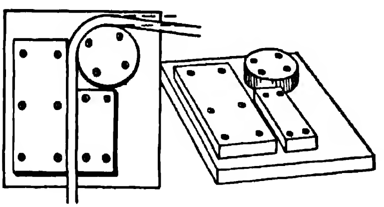


FIG. 3.31. Home-made jig for cold-bending tubing.

Either type of tubing can be cold-bent on home-constructed jigs. Before bending the thin-walled aluminum tubing, however, it is best to plug both ends and fill them with well-tamped sand. In addition, the round jig illustrated in Figure 3.31, should have

a concave curve turned or routed in its outer edge, to prevent any tendency of the aluminum tube to flatten.

Joints are made by capping the open ends of tubes with whittled hardwood plugs driven well in, as in detail B of Figure 3.32. These ends are filed to a concave fit against the round, side members, as in detail C. A hole is then bored through the side member into the wooden plug to receive a chromium-plated screw.

The japanned finish of electrical conduit makes an excellent foundation for enamel or lacquer, after it has been well sanded. Aluminum tubing can be polished with a buffing wheel on a flexible shaft, then given a protective coat of clear metal lacquer.

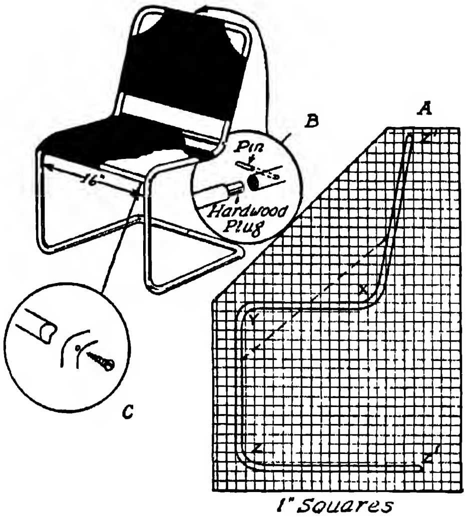


FIG. 3.32. Iron chair.

Iron Chair. Because of its thicker walls, ½-in. electrical conduit is chosen for the chair pictured in Figure 3.33. It is made in two identical sections according to pattern A, being spliced at the centers by the pinned hardwood plugs shown in B. Two stretchers form the seat and strengthen the frame.

After the full-size pattern is drawn on a piece of wrapping paper, sections *X* and *Y* are cut out and glued to pieces of 1⅛-in. hardwood to be band-sawed for the bending jig, one type of which is shown in Figure 3.31. The bends at *Z* in the pattern are identical to *Y*. As indicated in the drawing, the bend is made slightly more than required, to allow for springing. To calculate the radius of bend, the length of the arc is multiplied by 2 and divided by π (3.1416).

It will be noted that each of the two side members will require five bends, four of which are identical in radius but not in direction. Since electric conduit comes in 10-ft. lengths, a piece or pieces must be hacksawed off at some stage of the

procedure. Until skill in bending to measurement is acquired, it will prove the better practice to leave the two lateral bends (Z') until last, and to cut off the necessary overage after both side members have received their five bends. This procedure also leaves the pipe easier to handle, since the first three bends will all be in the same plane.

The jig is screwed with long screws to a heavy table top or a 2 in. × 6 in. piece wedged or fastened firmly to the floor so that it will not move under pressure during the bending. Marks should be made on the conduit with chalk or crayon at the exact center of each arc of the intended bends. The bending operation itself should be done slowly so that a check can be maintained on proper centering, moving the piping up or down in its slot when necessary to compensate for error.

The joints for the two horizontal seat members are made by driving hardwood or metal expansion plugs into the ends, then filing the ends of the plugged tubing concave to fit the rounded surface of the two upright members. They can then be fastened by screws through the upright side members as shown in detail C. If added security is desired, a full-length rod can be substituted for the plugs, extending far enough beyond the side members so that its ends can be peened as a rivet.

The back of gaily striped awning material is measured and stitched together to slip on over the top. The seat has hems at front and back into which the horizontal members were slipped before being screwed to the sides. For added crosswise strength, two strips of webbing can be hemmed and slipped over the side members before they are joined together by the hardwood plugs, which are screwed to each center joint; the webbing strips help support the fabric seat.

Aluminum Chair. By using 1-in. boards for the seat, a chair with aluminum legs and back can be easily bent to the pattern in Figure 3.33. As suggested at the beginning of this section, sand should be rammed into the aluminum tubing, after its ends have been plugged, and a concave groove equal to the diameter of the tubing should be routed in the edge of the bending disk of the jig, to prevent the tubing from flattening.

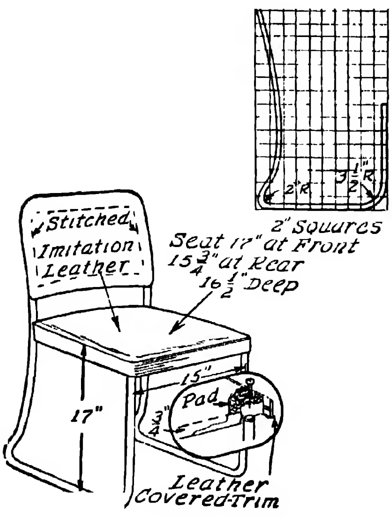


FIG. 3.33. Aluminum chair.

The ends of the front legs are plugged and inserted into holes bored halfway through the seat. Screws from the top of the seat are then driven into the leg plugs. The rear of the seat is fastened to the upright member by chromium-headed screws driven through the tubing.

The seat can be padded and covered by

a waterproof fabric tacked to the outside edge, which is then covered with a chromium-finished strip of the type available for edging sinks or table tops. A piece of the same facric is hemmed and slipped over the back as illustrated.

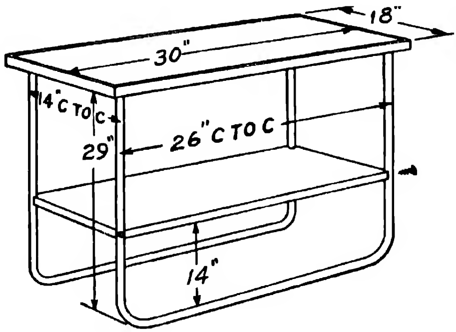


FIG. 3.34. Aluminum table.

Aluminum Table. A handy aluminum table with shelf, to match the aluminum chair is simply constructed as indicated in Figure 3.34. Two pieces of tubing are required with a total of four bends made on the same jig that was used for the front legs of the chair.

The top can be of waterproof plywood or of ¾-in. stock covered by linoleum or a resin-based composition. Its edges are bound with chromium-plated shelf or table-top edging.

The shelf is screwed to the legs in the same manner as the back of the chair seats, by driving chromium-headed screws through the tubing.

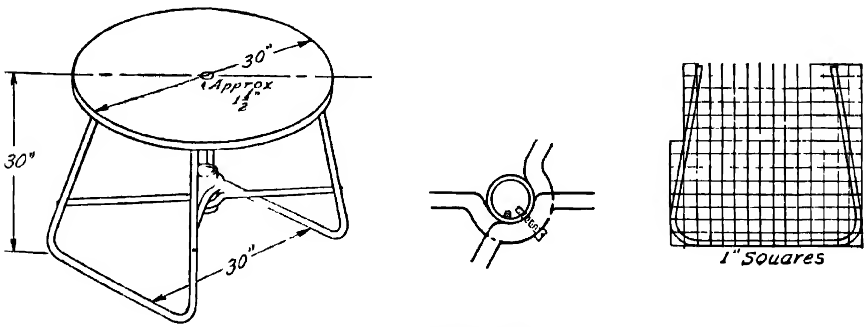


FIG. 3.35. Umbrella table.

Umbrella Table. For use with a beach umbrella whose staff pierces the center of the table top, the metal table illustrated in Figure 3.35 can be constructed of either aluminum tubing or electrical conduit. As will be noted in the drawing, the

legs have a more acute bend than used heretofore. They are plugged and screwed to the top in the usual manner.

The crossed stretchers serve not only to strengthen the legs, but also to hold in place a section 1¾-in. pipe for supporting the lower end of the umbrella. As shown in the detail, each stretcher is bent halfway around the pipe as a jig. They are fastened one above the other by plugging the ends, filing them concave, and then screwing them to the legs.

The waterproof plywood top has a 1½-in. hole cut in its center to fit the umbrella shaft. Its edge is finished with metal banding and its top with inlaid linoleum, enamel, or matting that has been thoroughly spar-varnished.

CONCRETE FURNITURE

In the garden, around the swimming pool, or strategically located on the lawn, concrete benches, tables, sundials, birdbaths, or Aladdin-like urns will not only point up the scene, but also successfully withstand the effects of weather throughout the years. Satisfactory concrete castings require no more than a normal degree of careful craftsmanship, with due regard for three fundamental requirements.

The first is that of mixture, which, for the type of work under consideration is known as the "1-2-2 mix"—one part cement, mixed dry with two parts of sharp sand and two parts of clean aggregate or gravel containing pebbles not larger than ¾ in. When these are thoroughly dry-mixed, water, not to exceed the proportion of 4½ gal. of water to the 100-lb. bag of cement, is hoed in to make the concrete. It is just as important to measure the amount of water used as it is to measure the other ingredients. Furthermore, it is important that the water be free from alkalis, oils, or acids; in general, water that is fit to drink is good for concrete. Concrete should be poured within thirty minutes after being mixed.

The second basic consideration for strong concrete is that of proper reinforcement. In the case of a long seat or table slab, unsupported in the center, a latticework of ¼-in. iron rods is imbedded in the concrete nearest its lowest surface. Such a lattice can have its longitudinal members spaced up to 4 in., with cross members spaced every 9½ to 10 in. For lighter castings, square fencewire or heavy chickenwire can be used, and for vertical posts or pedestals, almost any size of iron pipe can be utilized. No matter what the type or position of the reinforcement, it should never be nearer than 1 in. to any surface of the concrete.

The third important requirement concerns the molds or forms. Their inner surfaces, which are to come in contact with the poured concrete, must be finished smooth or with the design it is desired to impress upon the exterior surface of the concrete. The forms can be of any inexpensive tongue-and-groove lumber, assembled with butt joints that can be removed without injury to the completed casting. To facilitate this removal, the inner surfaces of the forms should be given two coats of leftover paint or shellac; just before the concrete is to be poured these surfaces should be brushed with a light film of machine or No. 20 crankcase oil.

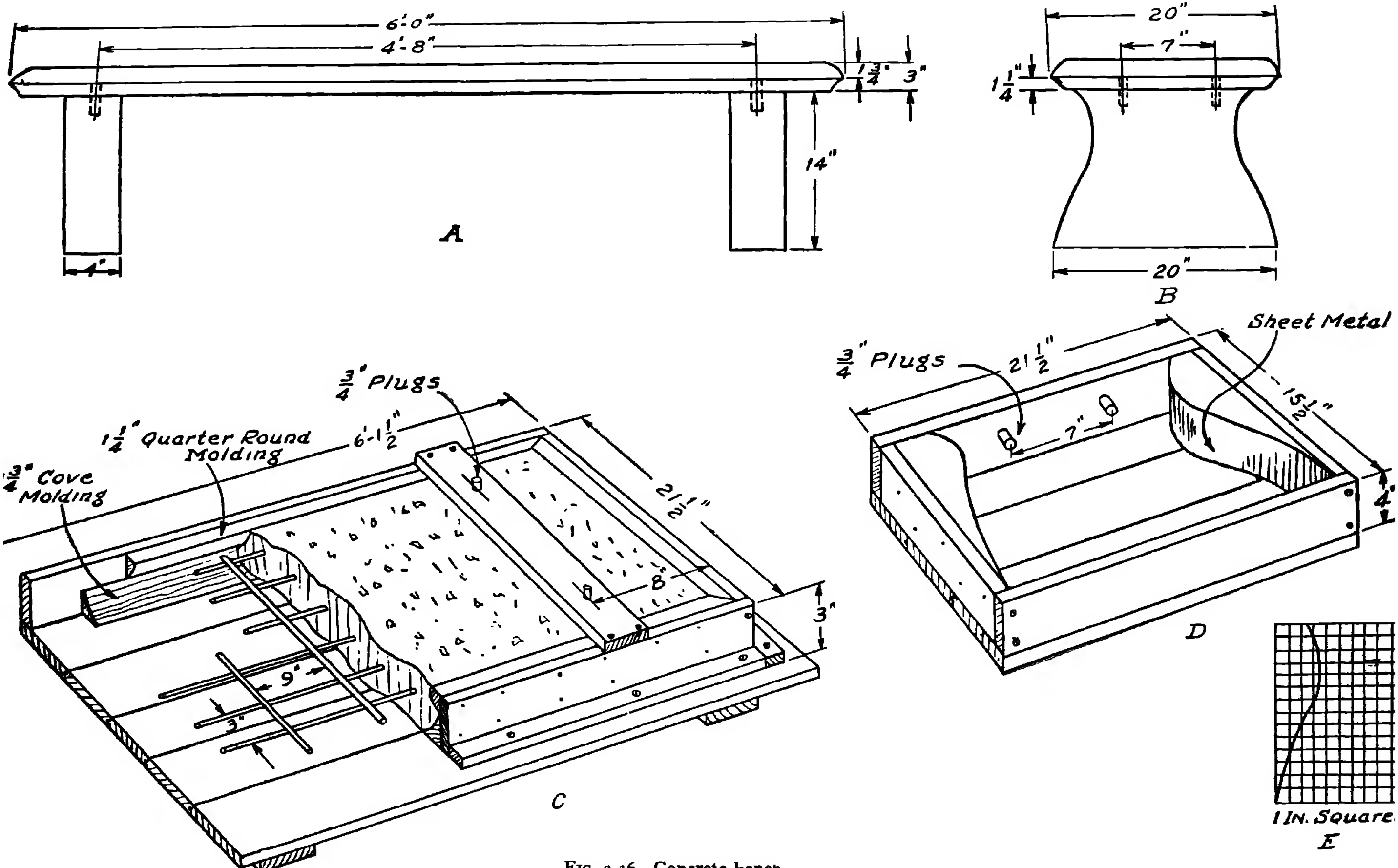


Fig. 3-36. Concrete bench.

To eliminate air pockets or irregular spacing of the aggregate in the mix, a thorough spading with edge of the trowel or piece of reinforcing rod is necessary in a vertical form. Any imperfections, separation lines between boards, impressions of grain or knots, and so on, can be troweled out after the forms are removed.

The forms should be left on for a minimum of forty-eight hours, the concrete being kept moist by covering it with burlap, which is sprinkled periodically. After removal of the forms, the casting must be cured for about ten days, being kept moist and protected from the sun and wind to prevent the crumbling so often encountered from too rapid a drying.

Color can be added in two ways, by mixing mineral colors with the dry cement, or by applying it to the finished product. Inthe latter case, either a colored grouting or a prepared concrete paint can be brushed on. This is a less durable and less expensive method than mixing the color in the concrete. A wash of white portland cement and water is pleasing against the green of shrubbery.

Concrete Bench. A traditional garden bench of simple design can be cast in three parts, which are later doweled together after being thoroughly cured. The rounded edge of the bench top shown in front and side elevations A and B of Figure 3.36, is formed by the use of a 1¾-in. cove molding and a 1¼-in. quarter-round molding nailed to the form, as pictured in C. Various combinations of moldings and square strips can be used to produce a more elaborate edge for the top casting, whose upper edge, however, should be rounded for comfort and long life.

The form for the top is set up on a platform of tongue-and-groove boards cleated together underneath and absolutely level. Since the top surface of the concrete casting will be molded by the boards of this platform, much later troweling will be avoided if they are butted closely and the surface planed smooth.

The 3-in. sides of the form are butted and screwed at the corners; to resist the pressure of the concrete, the sides are held in place at the bottom by cleats screwed to the platform as indicated in C. The moldings are mitered at the corners and nailed to the sides of the form from the outside to obviate nail holes in the finished cast. The entire mold is given two coats of paint or shellac and then oiled.

Since the casting is upside down and reinforcement should be nearest the underside, 2 in. of concrete are poured into the mold before the ¼-in. reinforcing rods are laid in place. Set on 3-in. centers the longitudinal rods should not exceed 5 ft 10 in. in length; the horizontal rods on 9-in. centers are 18 in. long. The rods are wired together at their joints to form a mat.

The remaining 1 in. of concrete can now be poured and leveled off with a straightedge across the tops of the form, and lightly troweled. During the pouring process of both layers, the concrete mass should be well spaded and tamped with the butt of an old axe handle to insure that the aggregate is evenly spaced, and that no air holes or corners of the form are left open.

Before the initial layer of concrete was poured, two cross braces at least 21½ in. long were prepared with two ¾-in. plugs or dowels 3 in. long, centered 7 in.

apart, as shown in end elevation B. These braces are now screwed to the top edges of the forms so that the plug centers are each 8 in. from the inner edges of the ends of the form.

Once poured, the concrete should be covered with wet burlap, and the form left undisturbed for twenty-four hours, or during cold weather, forty-eight hours. Great care should be exercised in unscrewing and removing the form in order to prevent injury to the green concrete. The latter should be cured by covering it with dampened burlap, sand or straw for at least ten days.

Meanwhile the form or forms for the supports can be constructed as shown in D. The two curved sections are band-sawed out of 4-in. stock according to a pattern such as E. Here, too, individual preference in design should have full sway, with due regard to the fact that it is advisable to line the inner surface with sheet metal to insure a smooth finish. The wooden plugs are accurately centered 7 in. apart as shown. After the form is shellacked and oiled concrete can be poured without recourse to reinforcement.

If the bench is to be placed on the lawn or in the garden a solid footing should be provided to prevent settlement into the ground. A good rule to follow is to dig a footing 6 in. deep whose surface is approximately double the area of the base it is to support. The same mix as that used for the bench can be poured into the square-cut hole, which is dug for the footings. It should be well tamped and allowed to harden at least twenty-four hours before the bench is set up.

In assembling the bench hardwood plugs can be used as dowels. The bench should not be set up for at least four, and preferably six, weeks.

Concrete and Wood Bench. A bench with a back and arms is easy to assemble when the concrete sides are poured with apertures for wooden slats forming the seat and back. As shown in Figure 3.37, these slats have tongues that protrude and are keyed to the concrete supports.

The slats should be of oak or other suitable hardwood, 1⅛ in. thick and 6 ft long. The back slats 6 in. wide and the seat slats 5 in. wide. All have tongues 9 in. long, which are 2 in. narrower than the width of the slats. Mortises are cut in the manner described in the instructions for the construction of the sawbuck table; the wedges or keys can be of the same dimensions.

Four band-sawed pieces of 5-in. stock are necessary for a pattern with the curves pictured in pattern A. These can be inserted in a square form screwed together as indicated in B. Well-oiled sections of the seat and back slats can be nailed from the underside of the platform in their proper spacing and held at the top by cleats across the form. A decorative opening under the seat can be any form fastened in place in the same manner as the molds for the slats. Certain sizes of tin cans can be filled with sand, gravel, or cement after they are nailed and braced in place, as forms.

Since the openings of the back slats are located 2 in. from the rear of the form, a reinforcing rod can be laid in as shown, after 2½ in. of concrete is poured into the 5-in. form. This can be tied in with horizontal rods above and below the seat.

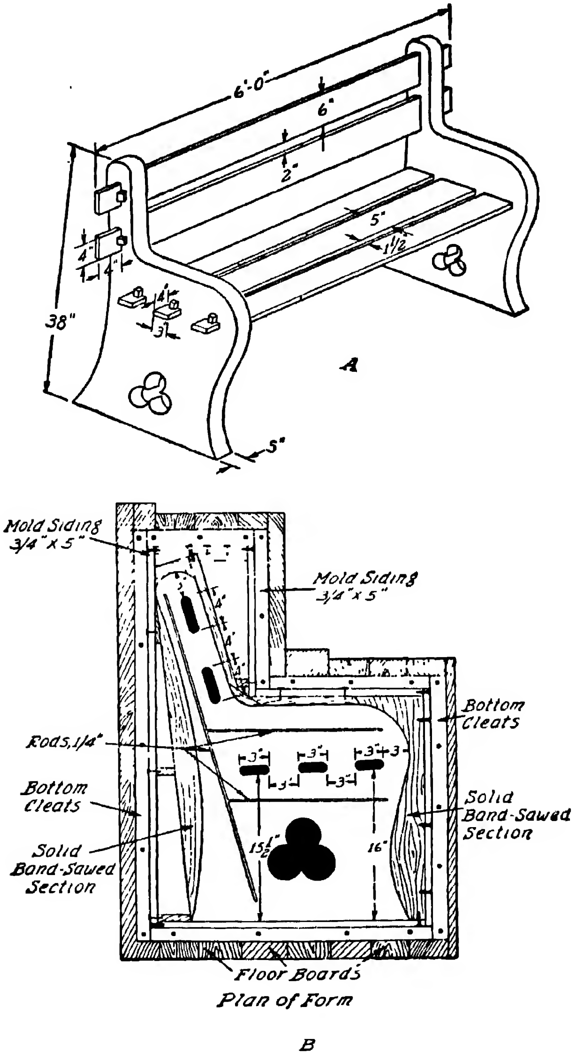


FIG. 3.37. Concrete and wood bench.

The remainder of the work is similar to that of the concrete bench, including the level footings.

Concrete Table. By increasing the width of the top of the bench previously described to 30 in., and raising the supporting legs to 27 in., a weatherproof table will result, capable of seating at least ten people. Such a table will have massive legs, requiring a considerable amount of concrete. If a lathe is accessible, a more graceful design with four separate legs is possible, with some additional effort.

One turned wooden leg similar to the pattern in A of Figure 3.38 is required as a core for molding all four legs. It is easiest to shellac this model while it is still mounted in the lathe, so that no surfaces remain exposed. The next step is the construction of a rough wooden box with screwed ends, large enough so that a minimum of 1 in. of plaster of paris can be tamped around the widest surfaces of the wooden core. Holes are then bored in the center of each end to take a length of available iron pipe, such as ½ in. The box is now sawed exactly in half, and the inside coated with two coats of paint or shellac.

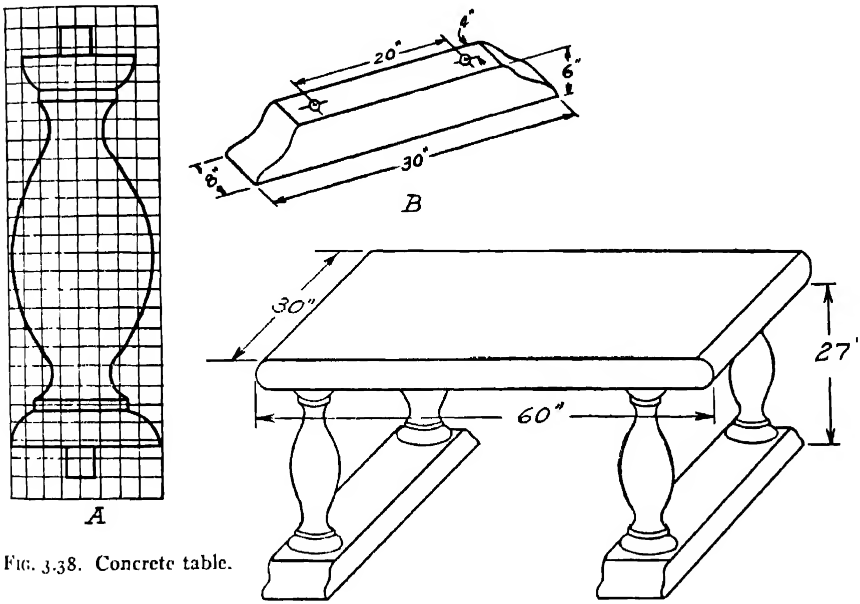


FIG. 3.38. Concrete table.

Next the core is laid in the lower half of the box, surrounded with well-tamped plaster of paris, and set aside to dry for about twenty-four hours. It is then thoroughly shellacked to form a "parting." Then the upper half of the box, with its top unscrewed, is placed upon the lower half, and plaster of paris poured in to complete the mold.

When the plaster in the upper mold is dry, the top of the box is screwed back into place and the halves carefully separated so that the wooden core can be removed. If small portions of the plaster mold chip off in this process, they can be repaired by more plaster. The inside of both halves of the mold is then thoroughly shellacked, then oiled, after which operations the two boxes are re-assembled and tightly bound with wire. The ends are unscrewed and a length of iron pipe inserted that will extend 1½ in. at both ends.

The concrete mixture to be poured into the mold consists of equal parts of

fine sharp torpedo sand and cement, without aggregate. It is tamped into place gently with a length of light rod or heavy wire.

When the four legs have been cast, forms for a suitable base for each pair must be prepared. Detail B indicates satisfactory dimensions; the silhouette will depend upon the number and type of wooden moldings employed. Care must be exercised to exactly locate the holes for the iron pipe dowels. The latter are cemented into their recesses in the bases and the top with a grouting of cement and water.

As in the case of the bench, adequate footings for the bases must be dug and poured. The table should not be set up until all parts have dried out for six weeks.

Terrazzo. To dress up the top of a concrete table or bench in colorful fiesta pattern, individually molded blocks of terrazzo can be cast and imbedded in a shallow recess in the top. This recess is provided for in the original casting by nailing rough lumber 5/8 in. thick to the platform so that its edges are 1¼ in inside the bottom edges of the sidepieces of the form, on all sides. The edges of this lumber should be straight and smooth, but the rougher the flat faces the better.

Terrazzo is a mixture of cement and marble chips, with color added to various parts of a design. Its surface is polished so hard as to be everlasting, making it an ideal material for outdoor use.

A design is first marked out on a pieoce of wrapping paper the size of the recess being cast in the table top. The decision as to colors is made at the same time, and marked on each segment of the paper for ready reference. The various parts of the pattern can then be cut out, so that identical forms can be assembled

All forms are ½ in. deep, and since it is difficult to mix the same color a second time, all forms containing one color should be poured at one time. By using a single base, forms can be made by means of cleats having common sides.

The terrazzo mixture is made up of one part white cement and two parts by volume of white or colored marble chips. Only enough water is added to make a stiff, workable mixture. It is poured into corners and acute angles first and allowed to mount 1/8 in. higher than the sides of the mold. It is then troweled and left to set for a while. Next it is rolled with a rolling pin to squeeze out the surface cement. The latter can be removed with a clean, moist paintbrush. Then the terrazzo is allowed to set for an hour.

The rolling process also impacts the marble chips more evenly, yet the surface of the terrazzo must be repeatedly troweled to a hard finish. When the surface feels hard to the touch it should be covered with clean waxed paper to prevent staining, then covered with damp burlap and allowed to cure for six days.

The last process is that of grinding and polishing. Three methods may be used, depending upon the tools available. The fastest, and probably the finest work can be done with a flexible shaft grinder equipped with a silicon-carbide run wheel and a wet spindle head. Coarse wheels are changed for progressively finer grades, care being exercised to avoid grinding rings in the surface. The final polish is applied with an ordinary carpenter's silicon-carbide hand stone.

For dry-grinding a portable sander can be used. Lacking these machines the work can be done entirely by hand, using a coarse silicon-carbide brick fitted with a handle, followed by a finer oil stone for the polishing. During the grinding, clean water must be used and constantly sponged off to observe progress. The surface should be ground down until it is free from all scratches. Air holes can be patched with a grout mix, which must cure overnight before it is ground. After the polishing is completed, the terrazzo should be cleaned with several applications of fresh water, and permitted to dry for twenty-four hours.

A simple waterproofing and stainproofing preparation consists of equal parts of boiled linseed oil and turpentine. This is applied to the dry terrazzo repeatedly, and the surplus wiped off, for three days. After the final coat has dried for twenty-four hours a good coat of automobile wax can be applied and the surface polished.

4

BUILT-IN FURNITURE AND CONVENIENCES

As a consequence of the postwar trend toward compact living, attention has become more and more widely focused on built-in furniture and accessories. Formerly tolerated as ingenious conveniences, they have emerged, in many cases, as necessary expedience. As in urban real estate, when the floor space shrinks perceptibly, the value of height, or wall space increases in proportion. Thus it is not unusual to encounter snug little living quarters with built-ins skyscrapering up the walls, leaving the moderate floor space uncluttered and hence, larger appearing.

The versatility of available wall coverings affords a variety of selection, which gives unlimited scope for harmonious treatments. Sheets of plywood with handsome hardwood veneers, or with wavy-textured faces bonded to their outer surfaces, are excellent mediums for built-in doors, panels and semipartitions. Wallboards are available in a variety of textures, finishes, and shades that lend themselves to attractive combinations. Knotty pine in random widths, applied vertically, horizontally or in panels, is stealing into kitchens and even bathrooms. Glass blocks and cloudy plastic insets accent the modern note in lighting effects. The list of materials is limited only by the imaginations of the designers, the styling of the room, and the utility of the piece or part to be constructed.

Built-in furniture is understood to comprise units that are constructed as part of the walls or floor of a room. Thus a console may be fastened to a wall, and for convenience, have its legs removed, leaving little more than a decorated shelf. So, too, various pieces of furniture such as bureaus, dressers, vanities, desks, chests, sideboards, and bookshelves find themselves flanked by wardrobes or closets into a continuous type of construction from wall to wall. Many older homes have eked out a scarcity of closet construction by the use of wardrobes and chests of drawers, which necessarily jut out into the room at irregular intervals. In others, large, deep closets are not rendering the complete service they are capable of. Such being the case, it would appear to be highly appropriate to examine into the possibilities of these built-in wardrobes.

Before becoming involved in the details of construction, however, a word of warning at this point is of urgent importance. Briefly stated it is the oft-repeated caution that when new construction or alterations are contemplated in an old house, it is a dangerous fallacy to assume that floors and ceilings are level, and that walls are plumb and meet at right angles.

Depending upon the integrity of the builders, the width and thickness of the footings, and the character of the soil or fill, all houses settle to a greater or less extent. Headaches and heartaches can be avoided if all seeming right angles are viewed with suspicion, and all vertical and horizontal lines checked and double-checked with level, plumb line, or square.

In the interests of time and lumber saving, some sort of jig similar to the wall-angle gage illustrated in Figure 4.1 will accurately speed up the installation

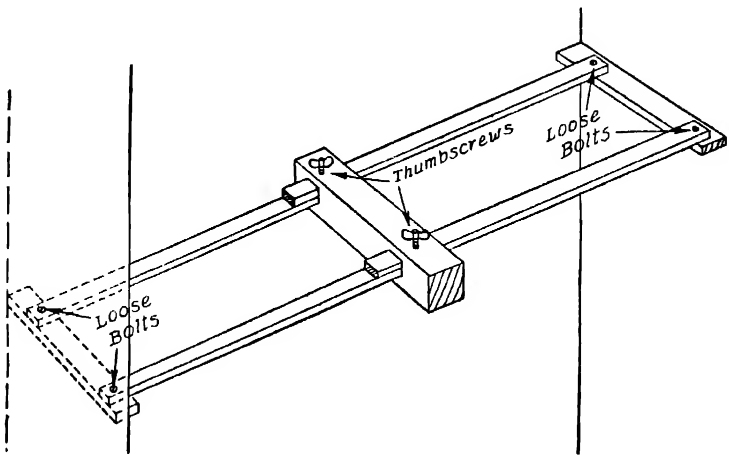


FIG. 4.1. Wall-angle gage

of shelving, or the horizontal members of built-in conveniences. Extended and applied vertically it is also useful for insuring snug-fitting side members between ceilings and floors, although a sliding T bevel, if clamped tight, can be used to advantage in transferring existing house angles to the material being used. Provided he learns to view such angles as suspect, the home craftsman will evolve his own method of measurement, thereby saving himself untold grief.

NICHES

A common form of built-in furniture, and one of the easiest to construct, takes the shape of the bookcases described in Chapter 2. Modern decorative trends, however, as well as the demands for economy in floor space, frown upon protruding bookshelves in favor of cabinets set flush into the wall. When these are to be

constructed in a pastered or otherwise finished wall, the home mechanic must concern himself with certain details of house construction.

The vertical 2 in. × 4 in. studs which back up the average wall are usually fastened on 16-in. centers, which means that when they are 1⅝ in. thick, they are spaced 14⅜ in. apart. Therefore, unless the box to be sunk into the wall to form the niche can be built with an over-all width of only 14⅜ in., one or more of

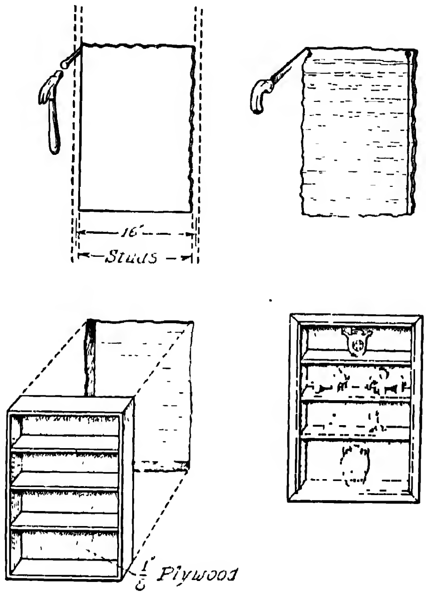


FIG. 4.2. Niche

the studs must be cut out the length of cabinet. This requires a little detective work in the form of tapping the wall with a hammer, to disclose the location of the studs. The dimensions of the proposed cabinet are then marked on the wall, with due allowance for 2 in. × 4 in. headers, which must be nailed horizontally across any severed studs. The procedure of boring holes and cutting out the lath and plaster with a cold chisel and compass saw is explained in detail in Chapter 11, under Constructing a New Inside Doorway. The cabinet or bookshelf is merely an open box made up of ¾-in. stock with a plywood back. It cannot be deeper than the width of the studding, plus the lath and plaster wall, and should be constructed to fit snugly between the headers and the studs, to which it can be fastened by finishing nails.

The edges may be finished off by moldings, as shown in Figure 4.2. In new construction, the plaster is often brought flush with the inside edges of the cabinet, without molding, as in Figure 4.3. This requires that bits of metal, lath, screenwire

or a series of tacks be fastened to the edges of the wooden cabinet to provide a bonding surface for the plaster. A straightedge is tacked along each edge in turn, against which the plaster can be troweled and allowed to dry. The shelving can be nailed permanently in place from the outside of the box-cabinet before it is inserted

Courtesy Ponderosa Pine Woodwork Association

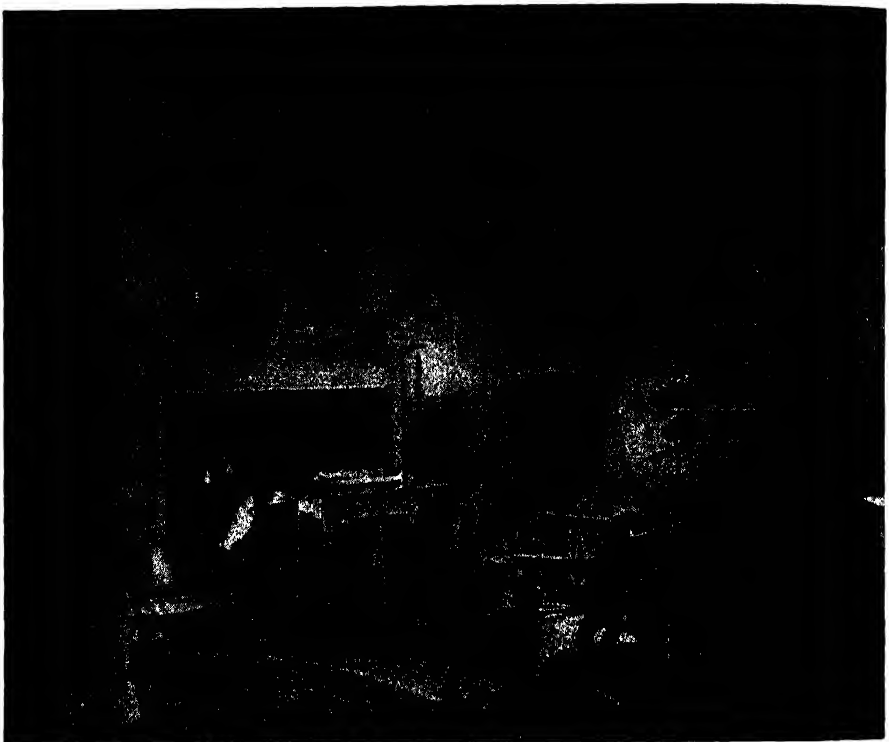
FIG. 4.3. Flush wall niche.

into its recess, or a series of holes bored part way through the inner faces of the sides, into which pegs or commercial plugs can be inserted, for adjusting the shelves to various heights.

When built into dining room, bedroom, bathroom, or kitchen walls, to hold dishes or cosmetics, the sides and tops of these open cabinets are often edged with scalloped plywood in French Provincial style, as in Figure 4.4. Tubular lights can be concealed by the top cornice, with the shelving graduated in depth in a stepladder effect.

Other favored uses for long but narrow niches include locations over the lavatory, or in a wall beside the bathtub (Figure 4.5), to hold toilet articles or cosmetics. A similar location over the kitchen sink will care for the soap and

cleansing materials. Recessed above a modern fireplace mantel are often found tall, shallow trinket niches for clocks, vases, or curios. More frequently the telephone handset is found recessed on a shelf in a flush niche in the wall, the lower half of which conceals the bell mechanism behind a brass grille, under a second



Courtesy Western Pine Association

FIG. 4.4. Living room niche with scalloped edges.

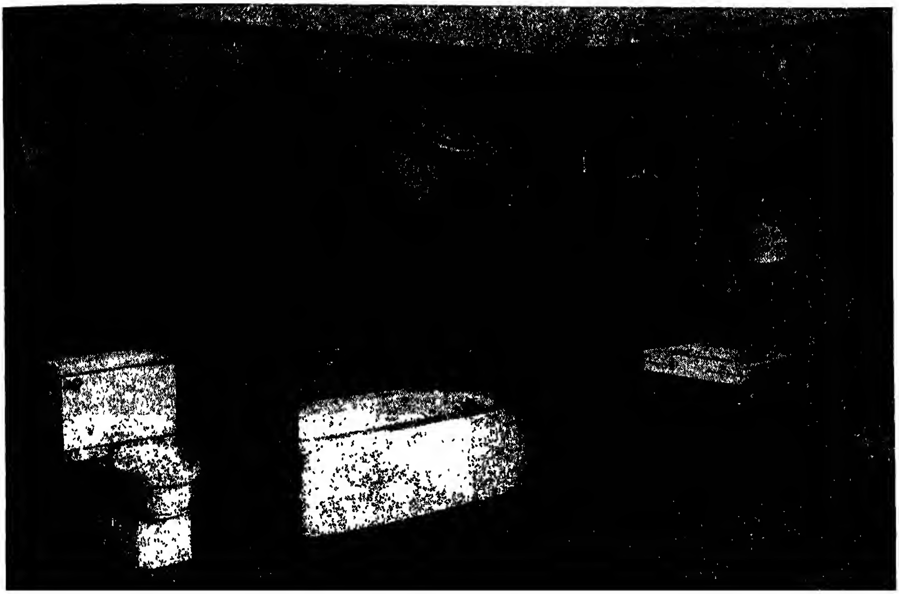
shelf holding the directories, as in Figure 4.6. Last, but not least, the ubiquitous ironing board has acquired a niche of its own, in or near the kitchen. The recessed cabinet shown in the kitchen utility cabinet later in the chapter (page 290) is of a width that will fit between studs on 16-in. centers.

VALANCES

Frequently referred to by their true architectural description as cornices, rigid box valances over the tops of interior window trim are rapidly becoming a modern "must." Not only do they serve as decoration to conceal the housings of venetian blinds, or to cover the bare poles or rods exposed by draperies or curtains which

do not meet at the top or are uncovered by swags, but also to unify the tops of the curtains or blinds with the window they frame.

In essence nothing more than long, narrow, four-sided boxes, the simplest types, shown in A of Figure 4.7, can be made removable to facilitate the replacement of curtains or blinds. The long front section, known as the apron or frieze, may be jigsawed from plywood and stained, cut from wallboard and painted, or

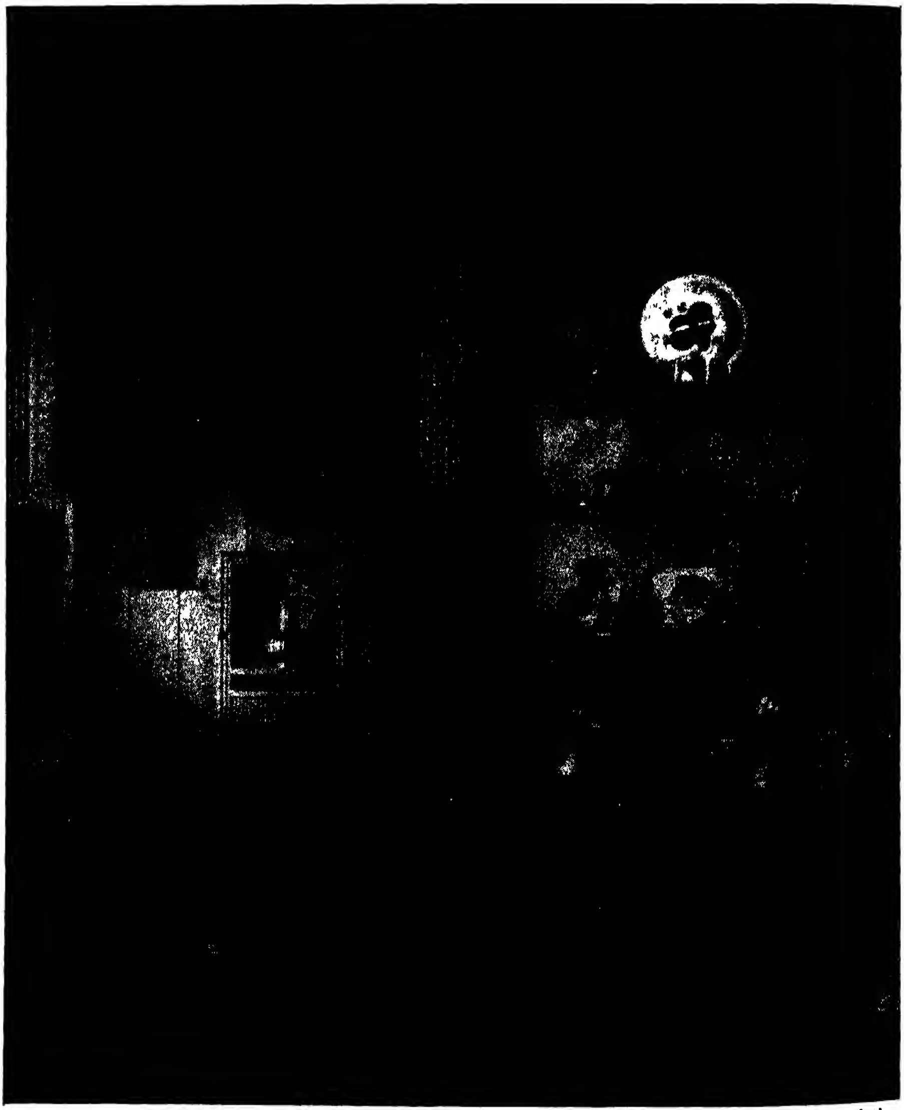


Courtesy Crane Co.

FIG. 4.5. Combination niche and closet.

scissored from several layers of cardboard, glued together, and covered with matching material or wall-paper. Good workmanship demands that corners be mitered whenever the apron material is thick enough, and that the top surface of the horizontal dust cap be flush with the top edges of the frieze and its two short side supports. The addition of a narrow crown molding around the top, as in B, will cover the exposed edges of the dust cap if it is nailed directly to the top edges of the other three members. On narrow windows the dust cap is optional; the inside corners can be strengthened if necessary with angle irons. In this case the side-pieces are hung over nails or screws in the end grain of the headpiece of the window trim. A permanently installed wooden cornice can be enameled white inside, and wired for a lumiline or fluorescent tube, which will provide indirect lighting against the ceiling, while permitting an interesting illumination of the curtains or blinds below.

As indicated in various illustrations in this and other chapters, valances perform a valuable service as tie-ins between pairs of closets, over dressing tables or desks, or to mark off alcoves of varying size. For a long narrow living room, a permanently installed valance over drapes, such as the one illustrated in Figure 4.8, will serve as a semipartition for a dining alcove. Cut from hardboard with a



Courtesy Western Pine Association

FIG. 4.6. Telephone niche with doors.

coping saw, the aprons are fastened to a U-shaped assembly of ¾ in.-stock (A, Figure 4.8 *b*) which is spiked to the ceiling beams. The drapery track is secured to the center member, and the joints between the hardboard and ceiling concealed by cove molding.

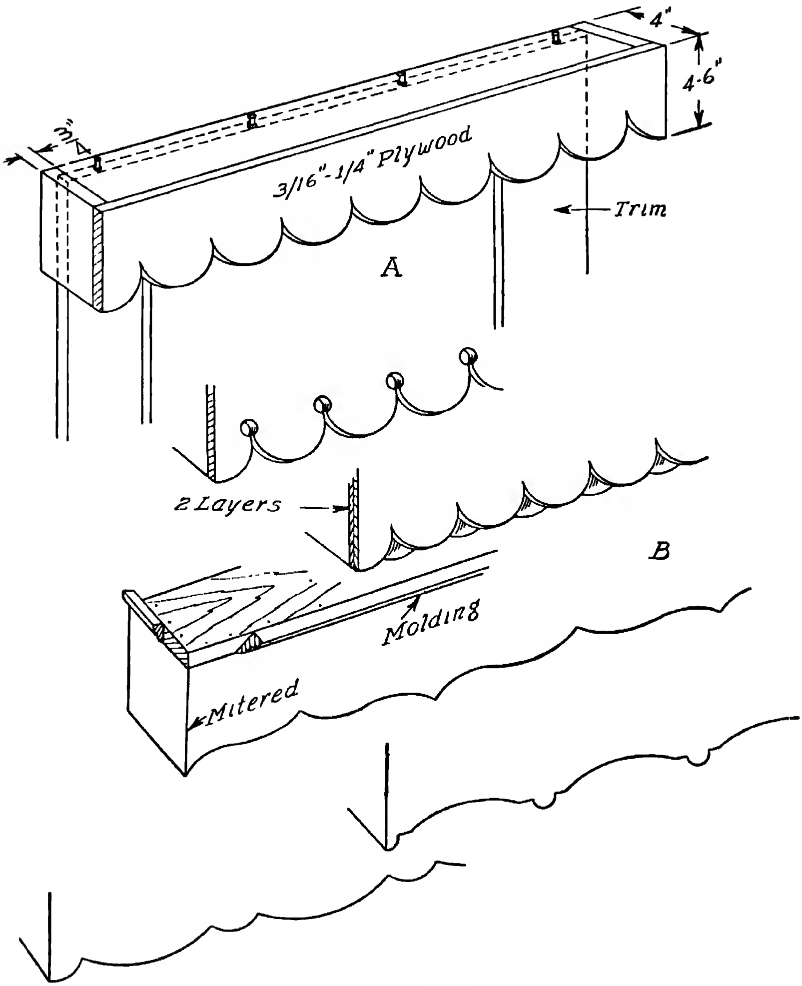


Fig. 4.7. Valances.

The shape shown in Figure 4.9 is a formalized treatment subject to individual variations. The longer the distance to be covered, the gentler should be the curves with which to soothe the ever-restless eyes. Although in constructing window valances it is customary to measure so that the short sidepieces butt against the ends of the headpiece of the window trim, in so doing it must be remembered that

heavy window draperies will be somewhat constricted. Often, therefore, it is desirable to optically widen narrow or misplaced windows, in which case the valance can be lengthened so that it extends well beyond the window trim on one or both

Courtesy U.S. Gypsum Remodel Research Home

FIG. 4.8a. Valance as a room divider.

sides, permitting the curtains or draperies to extend out upon the wall. This will necessitate attaching the sidepieces of the valance to extensions nailed to the headpiece of the window frame, or to angle irons bolted to the wall itself.

RADIATOR CAMOUFLAGE

A successful heating engineer tries to locate his radiators against an outer wall and in positions which will combat, to a maximum degree, incoming cold air currents. When unhampered by anxious householders, he appears to be but little concerned with the fact that his floor-consuming units almost invariably break up usable wall space, often violating the basic principles of proportion and harmony in the selection of locations. Since he is keenly aware of the influx of cold air that even the best-fitted sash and casements permit, his favorite site for a radiator

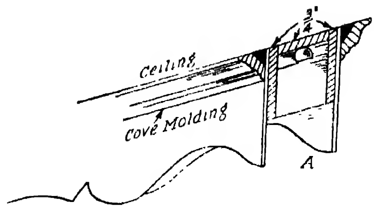
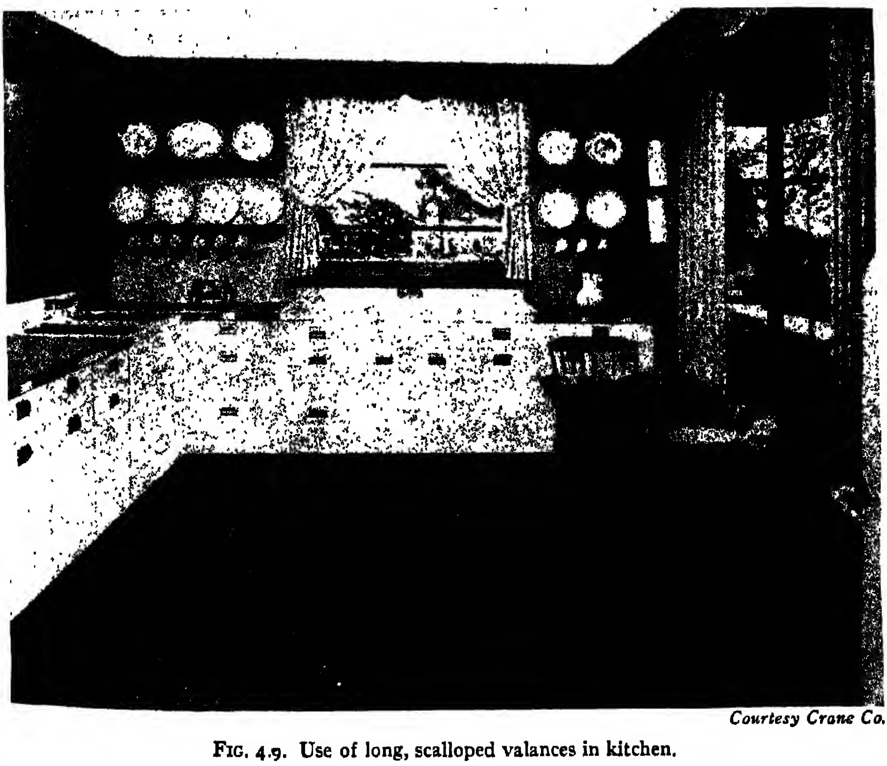


FIG. 4.8b. Ceiling valance concealing drapery track.

is in the valuable space below a window, so that the rising current of warm air will overcome the effects of the cool air, which sinks after being chilled by contact with the cold window glass.

While it is true that of recent years radiator manufacturers have been turning out low, square units that fit snugly under the average window sill, yet the space loss is annoying, especially since the radiator juts out where the light from the window naturally attracts a grouping of chairs and their attendant tables. Several styles of radiator covers or tops are available commercially, but their use adds little to the essential unattractiveness of a projecting radiator. It is not difficult, however, to conceal, or at least to camouflage a radiator which extends out into the room, provided that a few basic requirements are borne in mind.

Although all radiator enclosures have the effect of cutting off the emission of some heat waves, if properly designed, they will compensate for this apparent loss



Courtesy Crane Co.

FIG. 4.9. Use of long, scalloped valances in kitchen.

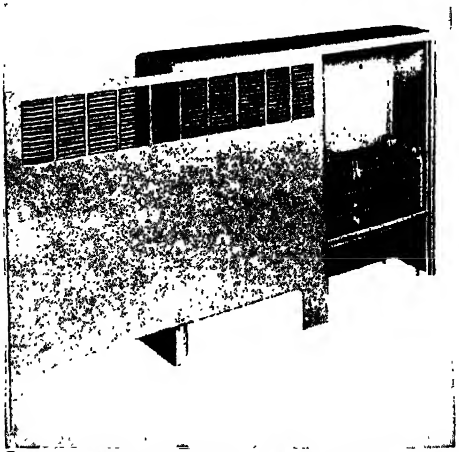
Courtesy American Radiator & Standard Sanitary Corp.

FIG. 4.10. Baseboard radiant panel.

by an increased flow and better distribution of the warmed air. Improperly designed enclosures, on the other hand, may reduce the radiator's heating efficiency by as much as 50 per cent.

When only a front grille is included in the radiator enclosure, the space between the top of the radiator and the solid top of the cover should not be less than the distance equal to the thickness of the radiator, measured from front to back. The second common fault in a radiator enclosure with a solid top is that of permitting the even flow of heated air to be trapped by the square corner where the top meets the back. Such a corner can be easily eliminated by bending a section of bright tin or galvanized iron into a curve, thus lining the back and top in one interrupted flow sheet which will throw the heat waves forward.

A third common fault is that of skimping on the size of the cool-air inlet at the bottom of the enclosure. A practical rule of thumb is to arrange that the cool-air opening is at least 80 per cent of the area of the top opening or grille provided for the egress of the heated air. This, in effect, creates a chimney whose draft will increase in proportion to the distance between the radiator top and the top of the enclosure.



Courtesy American Radiator & Standard Sanitary Corp.

FIG. 4.11. Cast-iron convertor radiator.

To prolong the stability of a wooden radiator covering, it should be completely lined with insulating material. Paper-thin sheets of aluminum over sheets of asbestos will act as efficient reflecting surfaces. In fact, the insulation of the rear wall behind the radiator will create considerable savings in heat absorption.

When remodeling extra space such as a basement or attic, where no heating arrangements previously existed, it might be well to investigate the advantages of baseboard radiant panel heating (Figure 4.10). This type of heating unit literally takes the place of a baseboard, and is as inconspicuous. Convector radiators (Figure 4.11) can be recessed into the wall so that the outer panel is flush with the wall, with which it can be matched by painting.

CLOSET DOORS

Closet-Door Racks. Closet doors are often found to be the worst offenders when the matter of utilization of existing space is analyzed. Many flat articles can be hung along the width of the inner surface of a closet door without interfering with the contents of the closet. Shallow fixtures such as those pictured in Figure 4.12 will singly, or in combination, care for a variety of items. Constructed from scrap lumber and dowels, rack A can be used as a shoe or slipper rack, or inverted

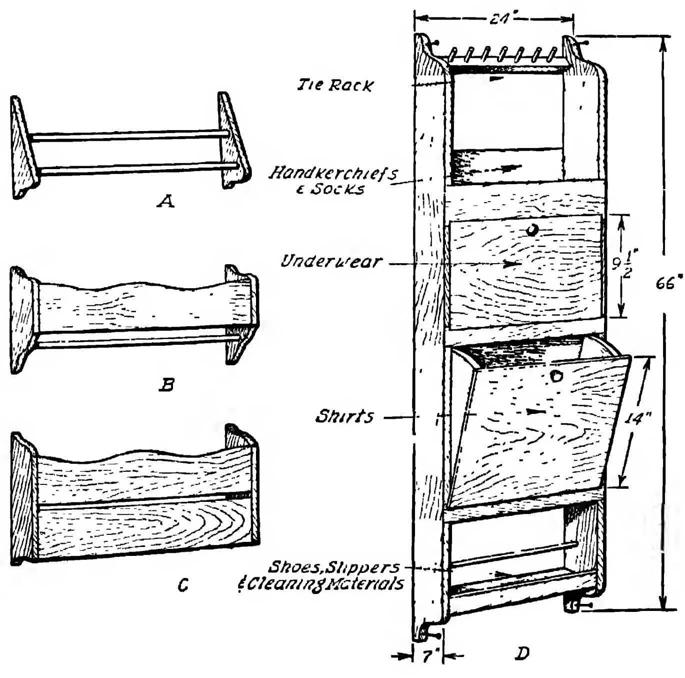


Fig. 4.12. Door valet.

to form a double rod for garment hangers; in conjunction with C, it can be so located as to serve as an efficient umbrella rack. Rack B serves to hold handbags and similar flat articles, as well as a garment hanger rod; C can be used for large knitting bags, china plates, or magazines.

Door Valet. For the men of the family the back-door valet illustrated in D is a handy means for securing additional storage. The dimensions indicated will fit the average-size door, when the tops and bottoms of the side members are screwed to the stiles or rails of the door. The sides can be of ¾-in. material held together by lapped crossrails at convenient intervals. Compartment bottoms may be ½-in. pieces of scrap with pieces of ⅝-in. plywood composing the hinged bin fronts. The ¼-in. plywood backs should extend far enough upward to engage the back of the crossrail immediately above them, to prevent the bin from falling forward and dumping its contents. The shirt bin should hold from six to eight shirts and the shoe rack can accommodate at least two pairs of shoes, plus the necessary cleaning materials.

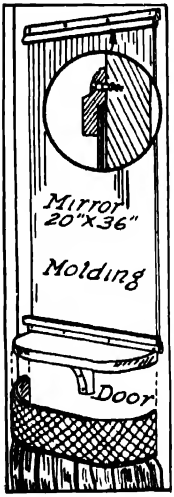


Fig. 4.13. Vanity.

Vanity. For the female contingent a simple closet door dressing table creates a capsule powder room on the back of any available door. As shown in Figure 4.13, it consists of a semicircular shelf bracketed to the door, with a thin piece of veneer bradded around its edge as a fiddle rail to hold the various bottles and jars. An organdy skirt can be hung in the conventional manner to conceal additional shelves, if desired. These may take the form of pairs of painted cigar boxes, screwed and bracketed below the top shelf. The all-important mirror should be fastened at the proper height.

Inner-Door Compartment. A more elaborate but highly ingenious utilization of door back space is by means of a shallow, inner-door unit hinged to a stile at the back of the door. As illustrated in A of Figure 4.14, when the closet door is so placed that it can swing back 180° against the wall, the compartment can be hinged to the lock stile so that it can be opened to a 90° angle. With a 32-in. door, an auxiliary storage unit 24 in. wide and 12 in. deep can be constructed that will serve as a dresser or a kitchenette. If open, railed shelves are substituted for the lower drawers in the drawing, an efficient bar can be assembled for compact entertaining.

There is nothing unusual about the construction of such a compartment except that it would be well to brace all inside corners with angle irons. Fingertip drawer recesses eliminate projecting knobs. The dresser top can be covered by plate glass, a mirror, or stainproof formica.

The inside of the door should be cleared of all projecting moldings, and the projecting door knob, if present, eliminated. This can be effected with the ordinary oblong key escutcheon by removing it and hammering its turned edges flat. A shorter knob spindle must be secured, to which a metal disk can be welded or

a washer peened to replace the interior knob. The flattened escutcheon plate is then inverted and threaded over the spindle so that the disk or washer rests upon its cupped, inside depression. It can then be screwed on in its reversed position, and the front knob bolted into place.

An extra hinge should be inserted in the closet door and a caster screwed to the bottom of the inner compartment's bottom to take up the weight when open. If there is a saddle under the door, a channel must be cut for the passage of the caster. The door-on-door unit is attached to the stile of the closet door by means of a long piano hinge, which will permit it to swing out at right angles with from 3 to 4 in. of its end resting against the door stile. The flush, plywood door to the inner-door unit shown in A is optional.

When the closet door opens only 90° and can rest firmly against a wall, there is no necessity for hinging the door compartment. In this case it can be angle-ironed or otherwise fastened directly to the back of the door, and the door hooked to an eye in the wall, if rigidity is necessary.

Folding Table. For use as a kitchenette or small hobby workshop, a drop front covering the shelving or tool rack can be hinged at the bottom to form a table top, as shown in B. The flat leg is butt-hinged at its top to drop into place as the top descends. It is held vertically in place by a cupboard snap catch or a pair of butterfly nuts.

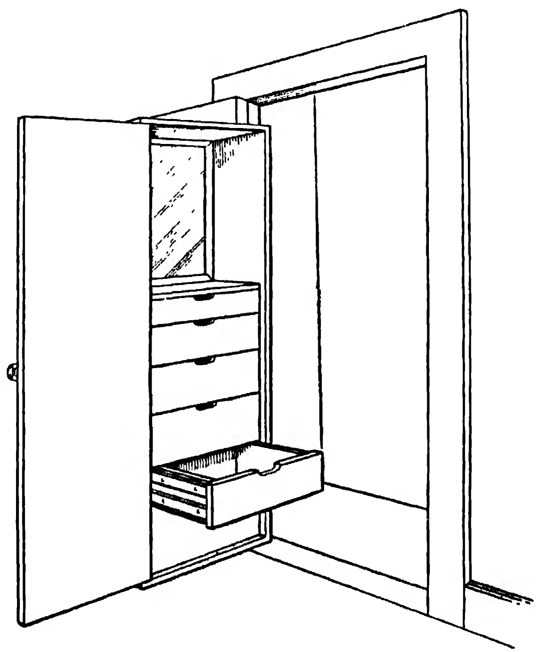


FIG. 4 14a Inner door compartment

Bookcase in Door. A built-in bookcase that does not sacrifice closet space can be fastened with angle irons to the rear of a door whose panels and center rail or stiles have been removed. As indicated in B, the over-all depth need not

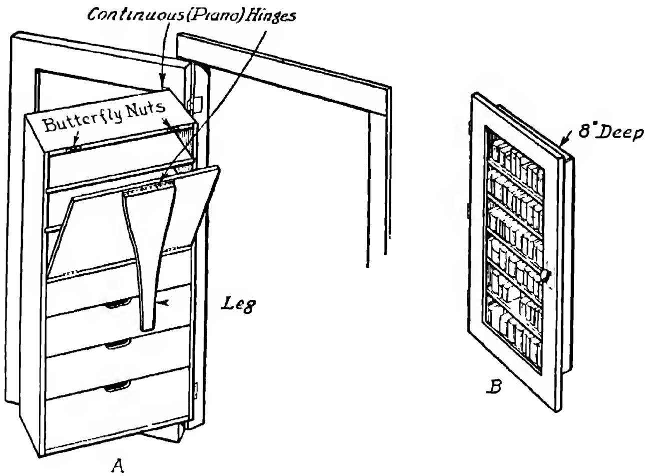


FIG. 4.14b Folding table and bookcase in door.

exceed 8 in., and if the shelves slope slightly to the rear, there will be less danger of the books falling out if the door is carelessly slammed. The same treatment can be applied to any seldom-used door, thus eliminating considerable construction when a built-in bookcase is desired, flush with the walls.

CLOSET PLACEMENT

Before leaving the subject of closets it should be emphasized that their position in a room has an important bearing on the location of built-in furniture. In older types of construction, closets often seem to have been added as an afterthought, jutting out into a corner of the room. This is also true of many remodeling jobs, where early deficiencies are remedied by later construction. This type of closet can be fitted out as a complete chifforobe in the utility room, as in Figure 4.15. Sometimes two closets are built into the same wall, one opening into one room and the other into an adjoining room, with a space between. This leaves an alcove which is a natural recess for built-in conveniences. Where only one closet is built into a room near a window, it is often worth while to construct a balancing closet on the other side.

Alcove Built-ins. Such an alcove is ideal for a built-in window seat (Figure 4.16), dressing table, desk, work table, snack bar, lavatory (Figure 4.17), head-board of a bed, or a double-decker bunk, depending on the size. For a simple

vanity, desk or snack bar, the easiest type of construction merely involves tapping the inner, facing walls of the closets to locate the studs, then nailing a piece of 2 in. × 2 in. or 2 in. × 4 in. stock horizontally across each wall, 30–31 in. from the floor. If the distance is not too long, all that remains is to add the board top across these cleats and face it with a 4–5 in. apron across the front. When necessary, a pair of old table legs can be cleated near the center for additional support.

Courtesy Ponderosa Pine Woodwork Association

Fig. 4.15. Fitting out a closet as a chifforobe.

To tie in the alcove with the rest of the room a cornice or valance can be cut out of plywood, wallboard, or cardboard-backed wallpaper or cloth, and fastened to the ceiling flush with the outer corner of the closet or closets.

Custom-Built Dressing Table. Better built-in construction involves the cabinetwork necessary to construct a piece of furniture that is cutom-built to fit a particular part of a room. In an alcove of sufficient length, a dressing table or kneehole desk with drawer space on either side (Figure 4.18) would normally be built with sides, in the customary manner. In order to insure a flush fit with the walls, however, vertical front side strips are applied in the manner of those used in the hunting board hutch described in Chapter 2.

The first step in constructing any built-in convenience is to see that the floor is level and the walls plumb. To proceed on the assumption that they are often

results in an unsatisfactory product, particularly if the house is an old one which has settled considerably. Should this be the case, allowance must be made so that the top of the vanity will be level, and its doors or drawers plumb.

Courtesy Ponderosa Pine Woodwork Association

FIG. 4.16. Window seat between two hall closets.

If permissible, it is best to remove the baseboard on the wall against which a built-in convenience is to be constructed, so that the sides can be built close to the walls. If this cannot be done, the side strips must be cut to the profile of the baseboard so that they will fit flush against the wall. This can be easily accomplished by pressing a length of wire solder against the baseboard from floor to wall, then using it as a templet to mark the section at the bottom of the outer side strips, which must be cut out as in A of Figure 4.18. Otherwise the construction of the make-up table or desk proceeds as usual, except that constant care must

Courtesy Curtis Companies Incorporated, Clinton, Iowa

FIG. 4.17. Twin cabinets in bathroom.

be exercised so that the top will be level and the sides plumb in the position they are finally to occupy. This is insured by fitting the parts into their recess or location in the room as the work progresses. After the outer sides and top are cut to measure they should be fitted together in position before they are fastened permanently. At the same time the outer side strips are tried in place to see that

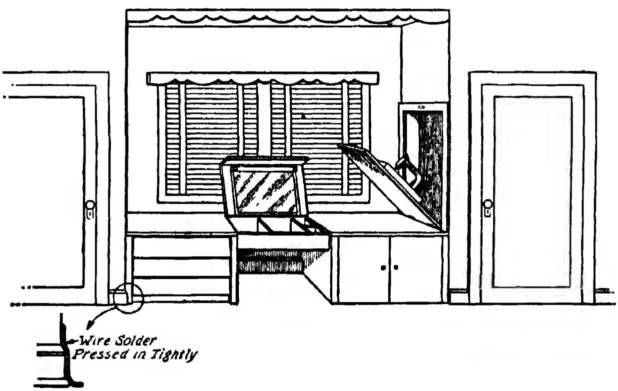
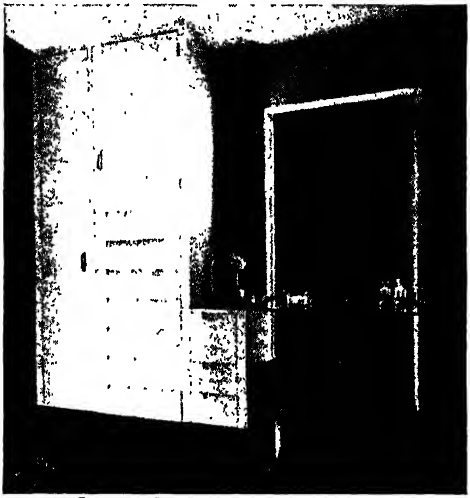


FIG. 4.18. Built-in vanity desk-table.

their inside facing edges are plumb. Next, the inner sides forming the kneehole are checked for height. If the partially constructed piece can be removed from its location, normal construction procedures can be maintained, with due regard to see that all rails, slides, and guides are parallel to the top, the piece being reinserted in position frequently, to insure proper fit. If the piece must be built in place it will often be necessary to measure accurately and fasten the drawer rails, slides, and guides to the sidepieces in advance of final assembly. Backing can be omitted in built-ins whenever it is possible to fasten rear rails, aprons, and similar



Courtesy Ponderosa Pine Woodwork Association

FIG. 4.19. Built-in glass top dressing table.

members directly to studding in the wall. For economy's sake the outer sides that are against or near the side walls can be reduced to parallel strips 1½–2½ in. wide, which can support rails, slides, and guides at each corner.

When the room's baseboard can be duplicated, emphasis on the built-in characteristic of the newly constructed piece can be secured by using sections of baseboard as bottom rails. In the dressing table shown in the drawing (Figure 4.18), the modern note is struck by a recessed bottom rail, which complements the knobless "clapboard" drawer fronts, inclined and overlapping to afford hidden finger recesses under their bottom edges.

In assembling the disappearing vanity, the two drawer cabinets can be constructed and fastened in place separately, if desired, provided that care is exercised that their tops are on the same level. The vanity or connecting portion can then be constructed and installed to fit so that its top, when closed, provides a continuous desk or work table surface.

As illustrated, the vanity cover is hinged at the rear in the same manner as

is used for the vanity chest in Chapter 2 (page 139). In this case, however, the inclined "clapboard" front is attached to the vanity's front edge where it can serve as a shield for a fluorescent light. The wire to the light can be concealed under one of the two inside moldings that serve as cleats, and is connected to an automatic switch screwed to the back hinge rail. The latter should be cut to a width that will permit the vanity top to rest against the rear wall or window frame, at a slope that will bring the mirrored inner side into proper position. Another type of built-in dressing table is pictured in Figure 4.19.

Dual Functionalism. The side walls above alcove built-ins can in turn serve as foundations for additional built-in features, thus doubling the utility of the basic project. For example, into one of the side walls over an end of the vanity-desk table previously described, can be built a panel to which can be attached a portable electric sewing machine, hinged outward to lay flat on the table top, as indicated in the drawing. To afford leg space under such a set-up, it would prove more comfortable to build the kneehole offside, with both drawer cabinets opposite the sidewall containing the sewing machine. An alternate method would be to substitute a hinged door cabinet under that side, with shelves set back to permit leg room, as indicated in the drawing.

Building in Old Furniture. Where the recess between the closets is narrow, it is sometimes possible to wedge an old bureau or dresser in place flush with the side walls, after the overhang of the top along the sides has been sawed off. A piece of baseboard can be lapped into the front legs, which may have to be

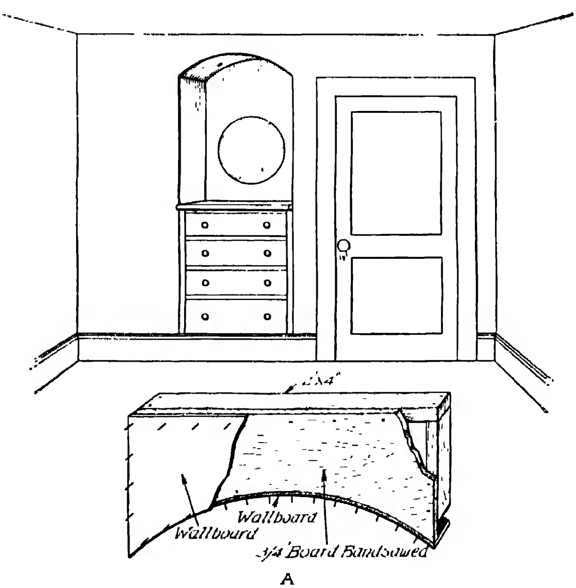


FIG. 4.20. Chest of drawers built into partition.

blocked up to secure the necessary height. Once the bureau is leveled up, the drawers are removed and the sides nailed to studs in the closet walls, using blocks where necessary to insure a tight fit. A deeper top can be cut from plywood if desired, and fastened to the original top to conceal any open space at the rear. A circular mirror fastened to the rear wall can be accented by constructing a falsework or solid cornice of wallboard (A, Figure 4.20) tacked to two wooden frames and nailed between the closet walls at the ceiling. When both dresser and cornice are painted to match the walls the effect is definitely architectural. A similar procedure is possible when building rooms in an unfinished attic. Available chests of drawers can be built into the low eave walls, with their fronts flush to the wall, during the process of construction.

Folding Screen Doors. If the closet or closets are deep enough to create an alcove that can house a bed, workbench, sewing machine or dwarf piano, for example, it may be desirable to provide a means for closing it off at times. One very effective method is by means of a pair of narrow paneled folding screens attached by hinges to each wall, so that they can be pulled together or folded back without danger of falling over. Serving as folding doors, they can be built to extend to the ceiling of the latter if not too high, and fitted with casters to facilitate movement. By using butt hinges with removable pins when fastening the end sections to the walls, they can be entirely removed if a change in the room plan is made at some future date.

ROOM DIVIDERS

Built out, rather than in, double cupboards constructed with a common central back are winning increasing popularity as semipartitions. In moderately low ceilinged rooms they can be built ceiling high, but since this destroys their mobility,

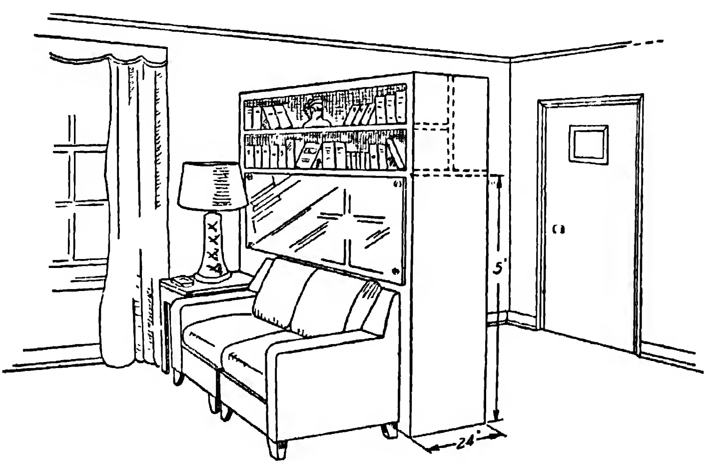


Fig. 4.21. Foyer.

they generally stop well short of 8 ft. in height. Since they are in reality two cupboards built back to back, their uses are many, and their interior construction varied.

Foyer. A couch-size cupboard in a long living room that has no vestibule can be placed to screen the entrance door and form a foyer, as illustrated in Figure 4.21. In this case the side of the cupboard facing the door could be constructed as a wardrobe for coats, hats, umbrellas and overshoes, wheras the opposite, or room side if left solid, would serve as a back for a couch or loveseat with shallow built-in bookshelves above, corresponding to hat shelves on the other side.

In order to save space on the foyer side of such a cupboard, sliding flush doors can be constructed of plywood, as shown in Figure 4.22. Depending on their thickness the frames can be mortised and tenoned or half-lapped, with central dividers and rails where the width requires reinforcement. After being covered with $\frac{3}{16}$-in. plywood, the edges are finished off by a mortised and mitered edging or banding, as shown. Rollers and tracks are available commercially, only requiring accurate fitting to insure ease in operation. The rollers and upper track are concealed behind a headpiece or rail extending horizontally across the cabinet. Thin chips or strips of veneer should be inserted between the doors when fitting them into place and aligning their tracks, so that sufficient clearance will remain for one to pass the other. Sliding doors are valuable additions to built-in furniture because the basic convenience of the piece is often menaced by its location with respect to the conventional hinged doors, which require considerable space when open.

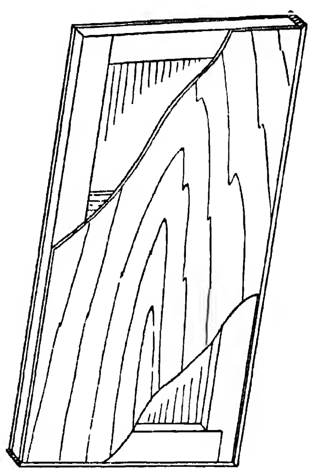


FIG 4 22 Plywood flush door.

Dining Alcove. Another useful room divider is a double cupboard to partition off the dining alcove. The "dining room" side of this type of cabinet is built similar to a tall sideboard, as shown in Figure 4.23. A counter space is provided below the upper cupboard, with shelves and drawers arranged to house the dishes, silverware, and linen required for complete dining service. The living room side may include bookshelves, a drop-leaf desk, a radio and record cabinet, couch back, or cupboards, as dictated by the room plan.

Powder Room. For the hostess who entertains, a wardrobe across an end of the bedroom near the door will provide a private dressing alcove, shielded from the rest of the room. To conserve space, a single cupboard in the form of a wardrobe can be constructed as in Figure 4.24, with a solid sheet of plywood as backing for the dressing table. Long rooms can accommodate deeper wardrobes with chests of drawers backing up the dressing table on the bedroom side.

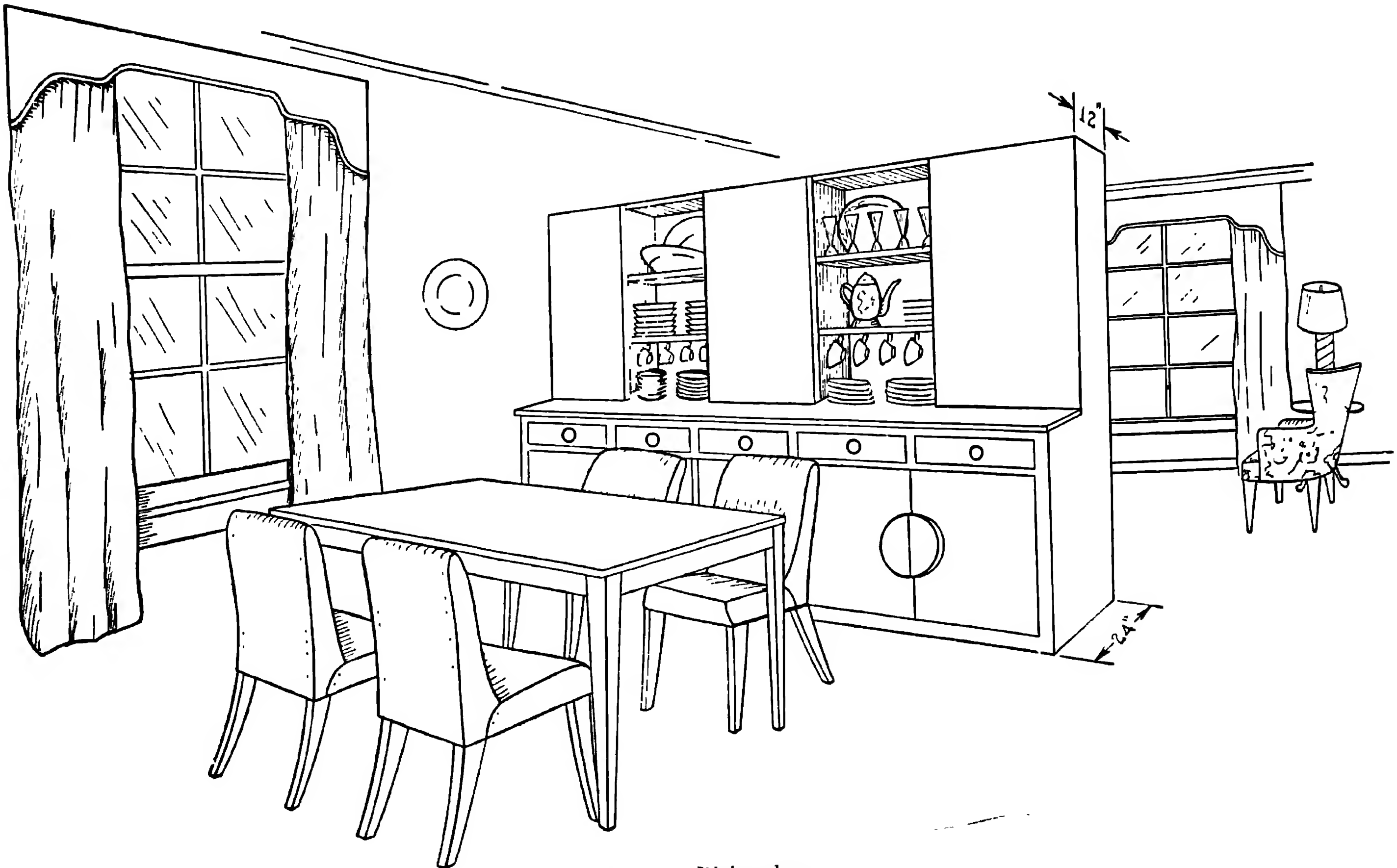


FIG. 4 23. Dining alcove.

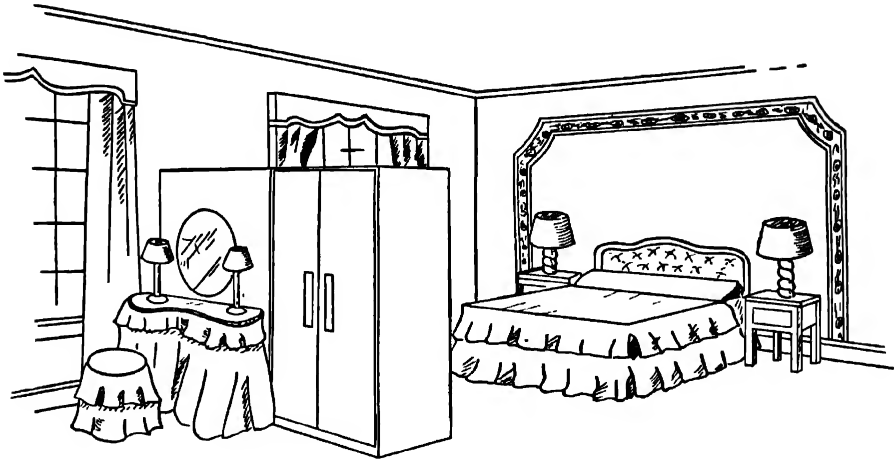


FIG. 4.24. Powder room.

Double Bedrooms. Semiprivacy for two persons in a single, medium-sized bedroom can be insured by echeloning the beds and shielding their heads by means of the wardrobes shown in Figure 4.25, or by installing a modified form of high headboard, such as is described later on in the chapter (page 282). As in all built-ins pictured in this chapter, the sizes are dependent upon the dimensions of the room, as well as the measurements and placement of the beds and other furniture. Construction details correspond to similar examples described in Chapter 2, modified by existing conditions.

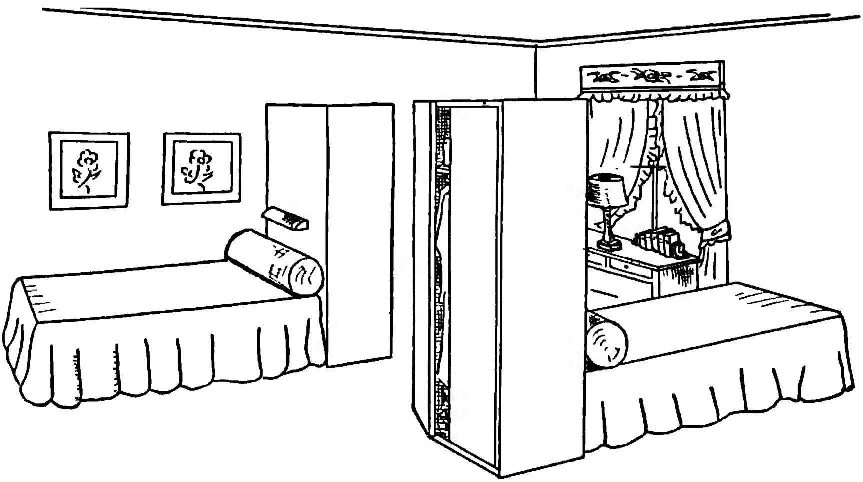
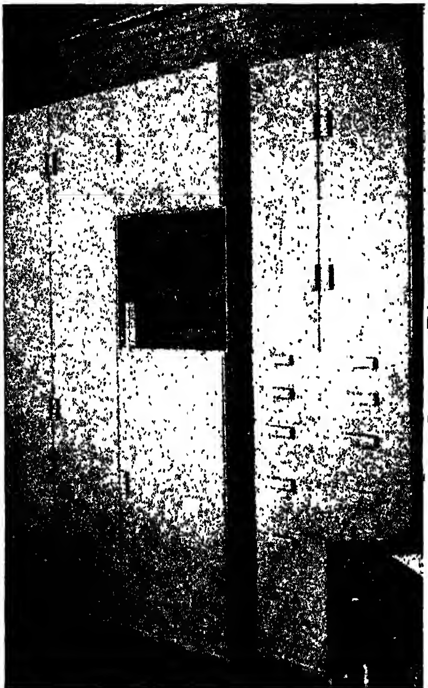


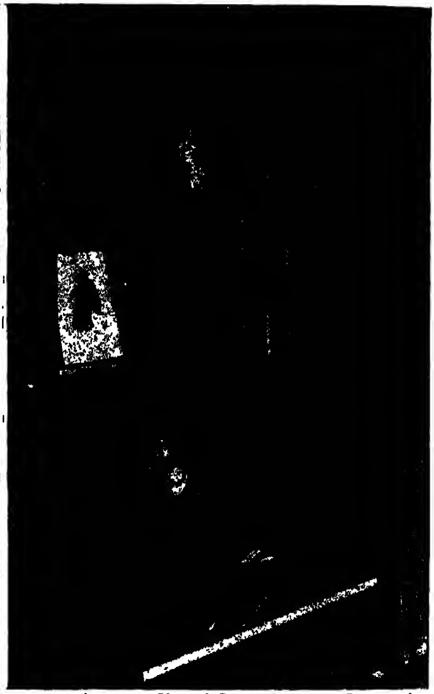
FIG. 4.25. Double bedroom.

Wall Storage. In order to conserve floor space, yet retain the conveniences afforded by various types of individual furniture, tall cupboards (Figure 4.26), closets, or wardrobes can be built from floor to ceiling, extending from all to wall. Flush doors, either hinged or sliding, can be constructed to form a paneled wall



Courtesy Storagewall, Inc.

Fig. 4.26. Wall cupboards.



Courtesy United States Plywood Corporation

Fig. 4.27. Walnut plywood built-in drop-leaf desk and sliding door front compartment wall.

when closed, permitting access not only to valuable storage space, but also to such built-in features as desks, radios, darkrooms, small workshops, sewing cabinets planning centers, and repositories for all sorts of games or sports impedimenta.

Drop-leaf desk fronts as in Figure 4.27, and large drawer fronts containing radios, victrolas, portable sewing machines and the like, can be centered or inserted in balanced locations to carry out the paneled effect when closed. Figure 4.28 shows another possible combination. Dimensions depend upon room size, ceiling height, adjacent doors and other considerations; construction details are simple modifications of those discussed in Chapter 2. Obviously a windowless and doorless wall is ideal for such a project, since the thickness of the false wall remains unrevealed when doors, drawers, or drop fronts are closed. With high ceilings,

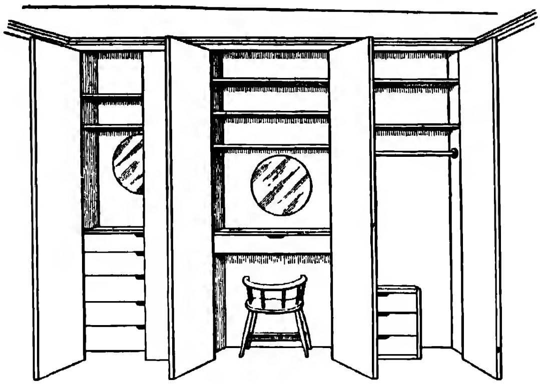


FIG. 4.28. Paneled closet effect.

upper shelves will mount to a normally unreachable height, yet are useful for storing seasonal items not required for everyday use.

The spacesaving value of sliding doors has been discussed, but there are many installations where hinged, outward swinging doors are peferable. This is always true when the entire space must be accessible, since sliding doors of necessity mask a section equal to the width of one door. When a deep work table is desired, it can be hinged at its rear edge to fold upward like the closet door table previously described (page 259), being supported in its open position by a hinged, drop-front leg or legs as already described, or by resting on cleats on the inside of the pair of hinged, masking doors, to which it can be firmly hooked.

When building a unit of this type across the wall of a room, if desks or work centers are to be included, the matter of adequate lighting should be considered during the progress of construction. Tubular lights behind built-in cornices or metal glare shields offer a practical and modern solution, by eliminating individual table and floor lamps, with their trailing cords. For a permanent installation it is best to use flexible BX cable connected by the necessary outlet boxes. Care must be exercised not to overload branch circuits in the event that heavy current consuming appliances are to be plugged into the line.

Book Nook. On a fairly wide side of a room, an available chiffonier or tall chest of drawers can be used to create a built-out alcove in conjunction with a corner of the room, as illustrated in Figure 4.29. A matching pair of chests can be used on a blank wall,

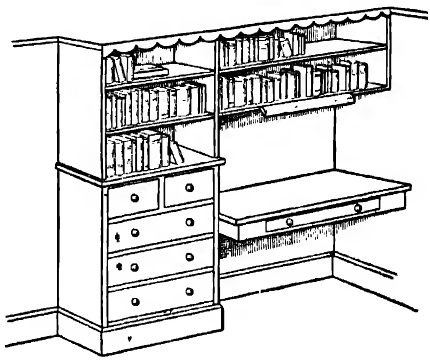


FIG. 4.29. Book nook.

or on a very wide side. As illustrated in the drawing, a chest of drawers is fastened flush against one wall, approximately 30 in. from a corner. The space between its top and the ceiling is then filled with built-in open shelving, until sufficient height has been reached to extend the shelves horizontally across the front of the alcove, to the opposite wall. The height of the lowest shelf from the floor can be quite low if the desk extends sufficiently beyond the depth of the chest of drawers. The number and height of the individual shelves will depend upon the height of the ceiling above the top of the chest, reduced by the width of the cornice across the front.

The desk can be a simple shelf 28 to 31 in. above the floor, to which a shallow drawer can be added for writing materials. A drawer from a discarded bureau or desk can be fitted into place, provided it is not so deep as to graze the knees of a person seated at the desk.

A wide chest of drawers will permit one side of the alcove to be flanked by built-in bookshelves, above the chest. This will necessitate a vertical side strip on one side of the inside corner of the vertical shelving, of a width equal to the depth of the shelves it houses. A wide desk top can accommodate a narrow drawer compartment at one side of the kneehole, if desired. A deep desk top will afford space against the wall for nests of small drawers. Whatever the size and construction, however, provision must be made for adequate lighting, either by means of built-in tubular elements, or through access to adjacent base plugs.

Closet Library. In older houses, large closets are often encountered whose size compares favorably with some of the kitchenettes and shower-bathrooms found in modern construction or remodeling. If neither of these latter conveniences

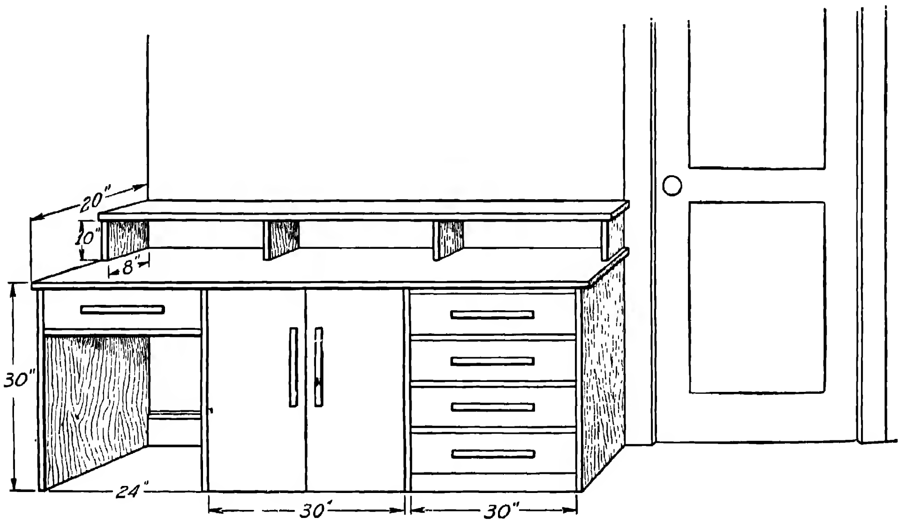
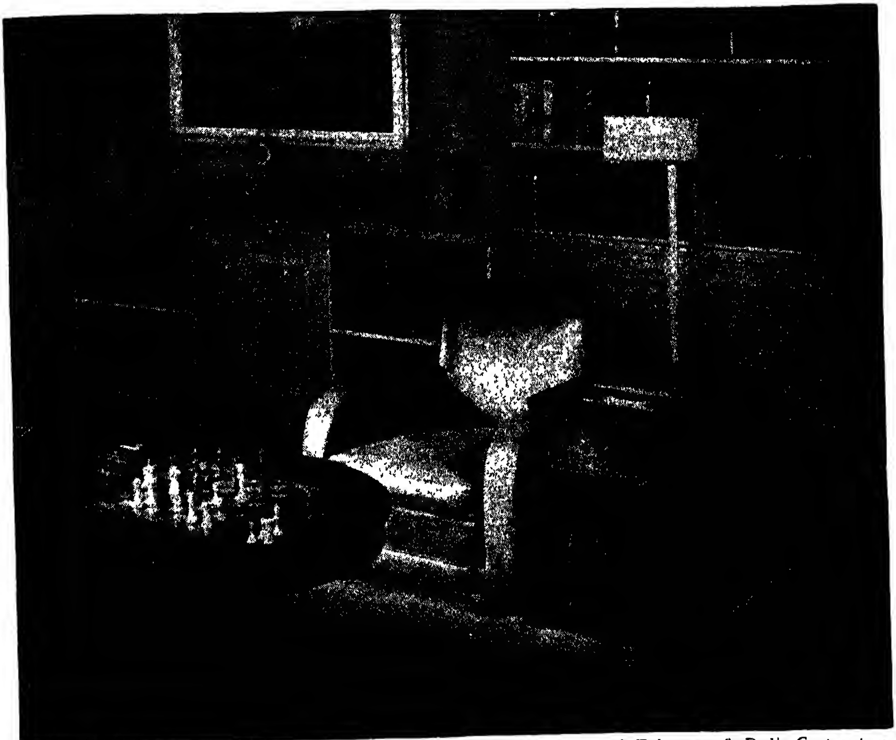


Fig. 4.30. Utility table and storage.

is required, it is a simple matter to install ceiling-high bookshelves with a built-in desk for reading or writing. Adequate light must be provided for, as well as ventilation in warm weather. Sometimes the closet is large enough to insert an old kneehole or roller-top desk, around and above which shelves can be built to create an office or planning center.



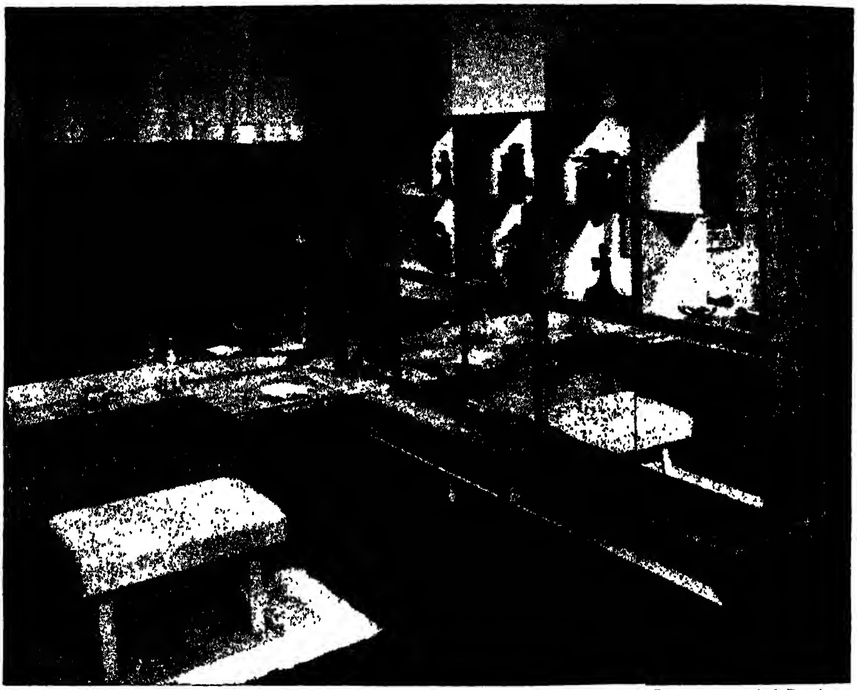
Courtesy Farnsworth Television & Radio Corporation

FIG. 4.31. Waist-high built-in cabinet with modern center door pulls.

Built-in Wainscoting. By lowering the height of built-in cabinets and fixtures, a continuity of line results comparable to the effect achieved by sectional furniture of uniform height. Cupboards, desks, chests of drawers, or bookcases can be built across a wall with a continuous top 29 to 31 in. above the floor, which can serve as a long work table or a shelf for ornaments, extra books or plants. The typical layout suggested in Figures 4.30 and 4.31 can be modified and improved to suit conditions.

This lower type of built-in fixtures can be used as a room divider in the same manner as were the high double cupboards. Sections which are to project into a cutoff portion of a room can be built with single or double functions, as desired,

the screening effect being achieved by a partition from the top or counter, up to the ceiling. This partition can be constructed of glass blocks, corrugated glass sheets, latticework, or a series of backless shelves as illustrated in Figure 4.32. Under certain conditions it may be possible to place pots of ivy or growing plants on open shelves of this type, to form a semiopaque partition of living green.



Courtesy Gimbel Brothers

FIG. 4.32. Backless shelves as a semi-partition.

IMITATION FIREPLACES

Modern heating efficiency has deprived many apartments and some homes of the traditional hospitality afforded by an open fireplace. The absence of this ancestor of interior heating creates a void in the consciousnesses of so many tenants that it has become common practice to replace the deficiency with a comforting imitation, complete with an artificial electric fire, which, when carefully assembled, creates a realistic illusion of warmth.

The construction of these mantels and fireplaces is not difficult, and when carefully measured, not only requires no break-through or defacement of existing walls, but does not infringe upon available floor space to any appreciable extent. Once a basic framework of 2 × 2's similar to that pictured in Figure 4.33 is con-

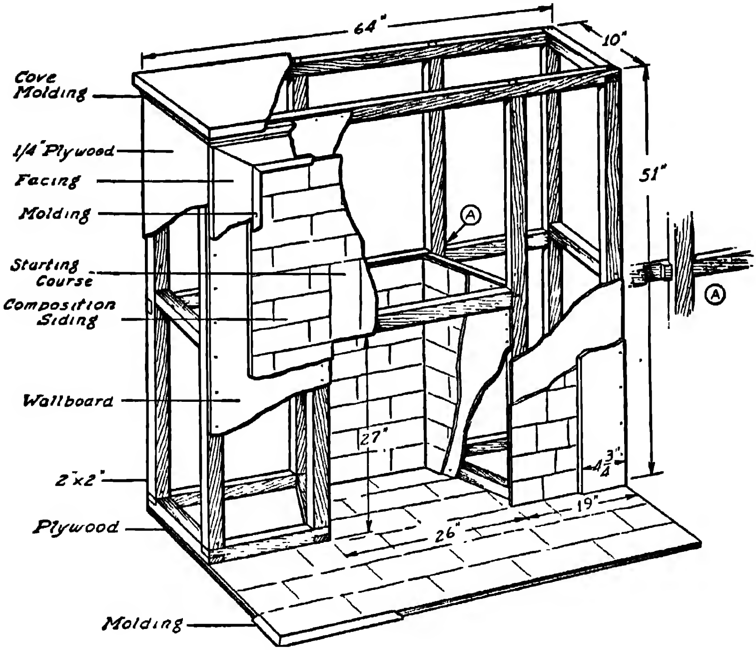
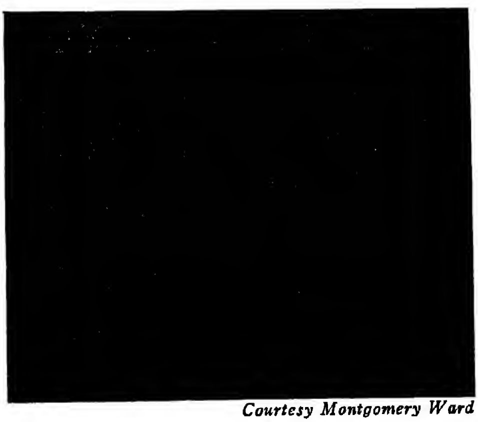


Fig. 4.33. Imitation mantel.

structed, it is only necessary to fasten in place materials representing brick, marble, or stonework and frame them with suitable woodwork.

Brickwork is successfully imitated by a maroon or tan composition siding, which comes in rolls whose outer faces of colored chips, cemented to an asphalt



Courtesy Montgomery Ward

Fig. 4.33*a*. Asphalt siding in imitation brick.

backing, are marked off into bricks, with dark-colored, cement-like divisions as in Figure 4.33*a*. Sections of this waterproof siding can be cut out and cemented to the wallboard falsework composing the front of the fireplace, with asphalt cement; brads can be tacked into the "cement" divisions where necessary. The wallboard firebox can be painted black to simulate the soot of many fires, or covered with blackened composition siding.

For a more formal effect, there is wallboard available that so closely imitates various Italian marbles as to be almost indistinguishable from them. This can be sawed into three pieces and cemented to the wall board front. If informality is the goal, varicolored bricks or cut stonework can be closely imitated by the use of plastic-textured paints. The cement divisions are first marked off on the wallboard, then each brick or stone is painted in separately before the single-colored cement division lines are added. Plastic paints have either a water or an oil base; the former can be colored by the addition of dry mineral colors, which, like calcimine, will dry several shades lighter. An oil base paint can be mixed at home by adding whiting to a flat, light-colored paint, until it has sufficient body to show brush or sponge marks when applied. It can be tinted with colors ground in oil, and if several receptacles are used, as many different shades and their variations can be applied as may be desired.

Modern artificial fireplaces are likely to bypass realistic materials and concentrate on line. A flat, terra cotta or black paint often delineates the front of the firebox, with a series of half-round shelves running up one or both sides for the accommodation of books and nicknacks. The emphasis in modern fireplace treatment is placed upon harmonious simplicity at the expense of traditional functionalism.

For the hearth, a sheet of black-painted wallboard or of linoleum fabricated to simulate tiles can be used effectively. This should lie flat on the floor, just as the side pieces of the mantel should be cut out for the baseboard so that their rear edges hug the wall, to further the built-in illusion.

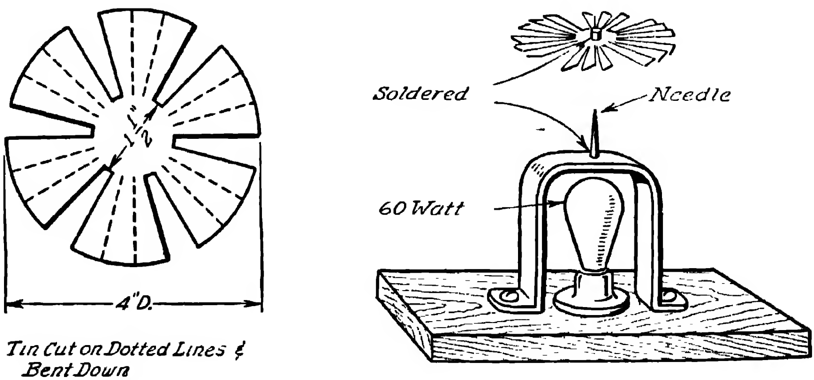


FIG. 4.34. Flickering device for artificial fire.

For the expert whittler, band-saw operator, or lathe enthusiast, wooden andirons offer an opportunity to express individual taste in design. Since they will not be subjected to a trial by fire, a coat of black paint will give them the solid appearance of wrought iron without the latter's weight.

To further the illusion of warmth during chilly days, an electric fire can be assembled that will create a startling illusion. The average commercial imitation log fire depends upon a red light bulb with a small "fan," hidden behind three birch logs slightly scorched with a blowtorch. Details of the light fixture and rotating fan that simulates the flickering of a fire are shown in Figure 4.34. Provision should be made for an electric outlet in the firebox during construction of the fireplace. Reality can be obtained only by actually burning the logs in some friendly backyard or vacant lot. The ashes should be collected and later sifted in a realistic manner over appropriate surfaces that have been coated with thick glue. The whole assembly can be fastened together with concealed nails or backing so that it can be removed and stored during summer months.

Details follow for the construction of the typical fireplace with imitation brick and white painted woodwork. The basic framework is jointed from 2 in. × 2 in. lumber, covered by any standard wallboard to which imitation brick siding can be cemented. The hearth consists of ⅜-in. or ½-in. plywood, to which siding is cemented.

The framework is constructed as shown in the drawing, with the ends of the bottom and top rails end-lapped into the ends of the side rails. The center back rail is center-lapped into the rear uprights, as indicated in the detail. The ends of all uprights are butt-jointed in place, by nailing through the lap joints. The upper ends of the four center uprights can be lapped into the rails for added security, if desired. The plywood hearth is nailed in place over the framing when the latter is upside down. When the frame has been righted, asphalt brick siding can be cemented to the hearth, up to the back of the fireplace. After it is dry, it is covered by heavy paper to prevent undue damage while the firebox is being lined with stout wallboard, to which the brick siding is cemented in even courses.

The front wall board can now be tacked into place, followed by the plywood side panels. Then the 5-in. facing strips are mitered and nailed into place, flush with the side panels.

In cementing the imitation brick siding to the front, care must be exercised to maintain matching courses of brick horizontally across the firebox opening. The top course on each of the sides of the firebox opening should be in prolongation of the sill or top of the opening, no matter what width of brick is displayed at the footing, or hearth ends of the two sides. It is best first to cement a vertical row, which comes as a special starting course, directly over the top of the firebox opening, then carefully measure the remaining space before cutting the siding with a knife or tinner's snips.

When the brickwork is in place, the molding around the inside edges of the

Material List

Lumber

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
8	1⅝	1⅝	47¾	Uprights
4	1⅝	1⅝	64	Front and back rails
4	1⅝	1⅝	10	Top and bottom side rails
2	1⅝	1⅝	6¾	Side (center) rails
1	1⅝	1⅝	26	Top rail, firebox front
4	1⅝	1⅝	7½	Top and bottom rails, firebox interior
1	⅞	11¾	67	Mantel top
3	1	¾	86	Cove molding
3	¾	4¾	168	Facing
3	¾	⅝	138	Molding
2	¼	10	51	Sides (plywood)
1	½	22	64	Hearth (plywood)
3	⅝	½	108	Molding

Wallboard

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	—	18$^{13}/_{16}$	51	Side panels (front)
1	—	24	27⅝	Front panel
1	—	18	28⅝	Firebox back
2	—	11	28⅝	Firebox sides

Composition Asphalt Siding

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	—	32	172	Regular courses
1	—	9	26	Starting course

facing can be attached, followed by the mantel top. A cove molding is mitered under the 1½-in. overhang of the top.

As already mentioned, realism requires that a mortise be cut out at the bottoms of the side members, to accommodate the baseboard of the room. A convenience outlet should be wired into one of the sides of the firebox to accommodate the

electric fire. It is well to inset a base outlet flush in the top of the mantel top at the same time, for attaching an electric clock. A pair of outlets at each end of the top, hooked up to a switch on one of the side panels, will serve electric candlesticks, if desired.

TRIPLE-THREAT MANTEL

The passion for utilizing waste space has extended to the shallow projections of imitation mantels into the room. By hinging the three front parts as indicated in Figure 4.35, access is gained to storage space that would otherwise be lost. In

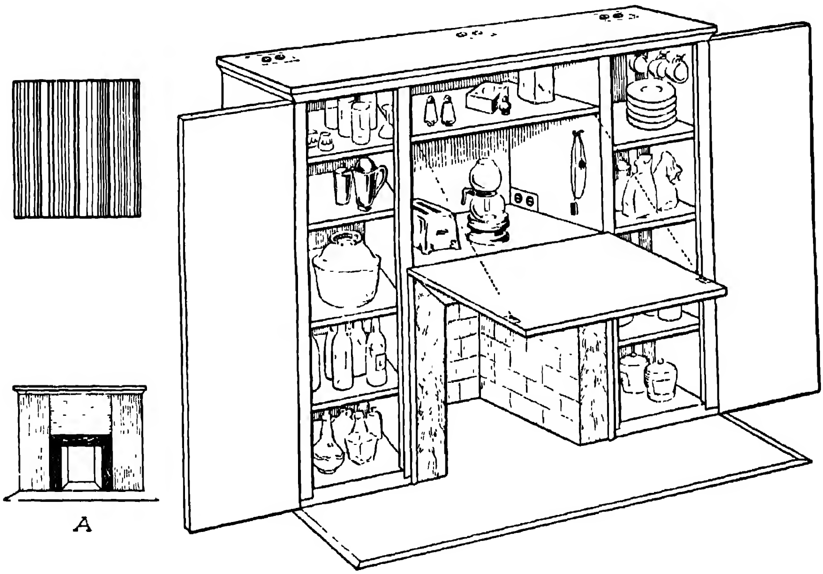


FIG. 4.35. Triple threat mantel

the picture, the central portion forms a tiny kitchenette or snack bar, with storage space on the right. The left-hand cupboard is devoted to the bottled goods and glasses of a cellarette. Optional uses for the central section would be as a dressing table or writing desk. Sewing materials, games, or with the shelves removed, extra folding chairs could be stored in either or both of the concealed upright cupboards.

The interiors of the cupboards can be left unlined for extra storage space. The front consists of two vertical strips of Weldtex with a horizontal strip between, cemented to plywood doors, as shown in detail A. Invisible link hinges are used, and chains installed to support the drop-leaf central portion. Friction catches hold the doors shut, and fingertip recesses are chiseled out in place of visible handles.

Narrow sections of marbelized sheet asbestos are used in a modern representa-

tion of the front of the firebox, framed with narrow molding. This requires an additional inner framing and consequently smaller firebox. A sheet of the marbelized asbestos can be used as a hearth, or a sheet of plywood painted black.

In detail A, three panels of 5⁄16-in. striated plywood known as Weldtex are used as a covering for the doors and drop-leaf section. Cemented or bradded to a ½-in. ordinary plywood backing, this 3-ply veneer makes an interesting surface, with the grain of the center panel at right angles to the vertical graining of the side panels. In fastening the material to its backing, skillfully countersunk brads can be used in the valleys of the corrugations, if desired.

BEDROOM MASQUERADE

Exclusive of one-room, all-purpose apartments, there is a growing sentiment in many small homes toward the establishment of what is known as a utility room. These rooms take the place of what was formerly called the den, in that they can be used as studios, card rooms, sewing rooms or hobby centers, with the added requirement that they can be transformed into impeccable guest rooms with a minimum of preparation. It is here that built-in features come into their own.

Banquettes. The average daybed even when backed by removable cushions is a bit too wide for a comfortable sitting posture. This is aggravated when a wide daybed or a set of springs and mattress is selected for extra duty as a double bed. The width of such a couch can be easily narrowed for daytime sitting by the construction of a shallow, sloping plywood back under which the couch can be slid. As shown in Figure 4.36, a plywood door can be hinged at the bottom to

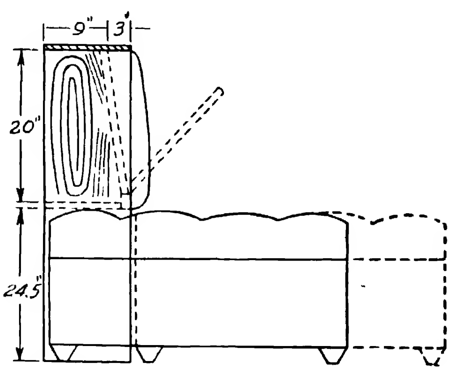


FIG. 4.36. Banquette.

give access to the sheets and blankets stored in the compartment created by this false back. Construction details resemble those listed under the compartment headboard, which is described later in the chapter.

Built-in end tables and bookcases can be added, together with one or more

wide shallow drawers underneath, for the storage of comforters or puffs. When constructed in a window recess or similar alcove, an overhead cornice against the ceiling will create a partial division, which can be augmented by curtains.

Bunk-Beds. If it is desired to transform an unsightly old metal or wooden bed into a built-in couch or banquette, it is a simple matter to construct a boxlike frame of ¾-in. knotty pine to fit the springs at the desired height. Following the general principles outlined for the beds described in Chapter 2, slats are accommodated on cleats screwed to the inner sides of the upper part of the frame for the springs to rest upon. In a long, narrow room, space may exist for a pair of built-in bunk beds placed end to end, separated by a common built-in night stand.

Built-in wall storage, or sectional furniture will complete the transformation of the utility room, with desks doubling as dressing tables, and chests of drawers either built in sectionally or concealed in wall storage, which can also house the room's primary occupational equipment.

Double-Decker Bunks. When concealment is of secondary importance to conservation of space, the double-decker bunks described in Chapter 2 can be made permanent fixtures by substituting four long timbers for the corner posts. The side and end members are tenoned deeply into the posts and pegged for security. Here, too, the underbed storage space can be utilized by a built-in drawer or drawers for extra linen and blankets. A pair of these double-deckers in a summer camp or in the nursery, will provide four beds in a minimum of floor space.

Compartment Headboard. We are frequently confronted with photographs of freelance executives whose offices are apparently their beds, fitted up with fabulous headboards into which have been built all manner of modern office devices and sleep-promoting gadgets. While most of us must be content to spend less time in bed than modern medical practitioners recommend, nevertheless there are certain aids and comforts that tend to prolong our relaxations, when placed within easy reach of the downy couch. Among items considered indispensable by many are a suitable reading light, an ashtray and beverage holder, space for reading materials, a radio, and the telephone. The latter instrument has gained mobility through the telephone company's willingness to install, for a small charge, plug-in receptacles in various rooms for a single handset.

The auxiliary headboard (Figure 4.37) described below is suggested as a simple design that will fulfill basic requirements. Primarily an elaboration of the popular Hollywood headboard, it can be painted to blend with the room's trim as it stands behind the head of any standard twin bed.

As pictured in Figure 4.37 the upper corners of the top of the headboard are mitered and the inside of the rear edges of the two long sidepieces are rabbeted to receive the ¼-in. plywood back. The 10-in. sidepiece for the built-in night stand can now be glued to the long sidepiece so that the bottom edges are flush and square. The top of the night stand can also be glued up at this time. When dry, it is cut to the same curve as the cleat in detail B, a ½-in. overhang being allowed over the door end. The rear of the top is cut to a width of 17 in., the

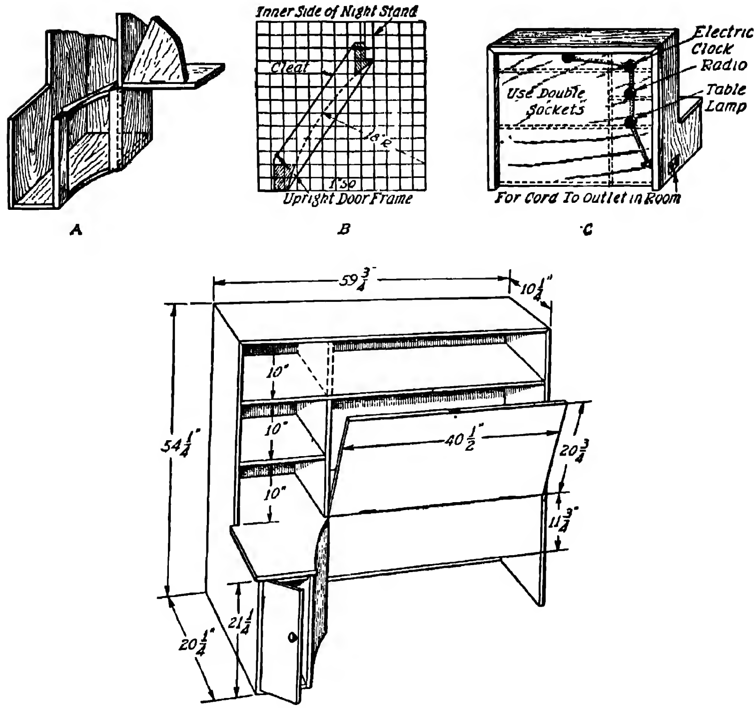


Fig. 437. Compartment headboard.

front half being allowed to extend 1 in. on either side, so that it will overhang the outer edges of the inner and outer sidepieces by ¼ in. The bottom piece of the night stand is cut to the same curve of 18-in. radius but fits inside both sidepieces and permits the top to overhang the curved side, which is ⅛ in. thick, by ¼ in.

The long upper shelf can be butt-jointed into place 10 in. below the top, if the finish is to be paint or enamel. The dimensions given make no allowances for dadoes. The inner side is now butted to the shelf, 17 in. from the long side. The divider can be toenailed above and in prolongation with the inner side, and through nailed or screwed to the top. The side shelf is fastened 10 in. below the long shelf by screws or nails through both sides, countersunk, and covered with plastic wood. The bottom of the blanket compartment is likewise fastened in place, with the sill face-nailed to it along its bottom edge.

After the upright for the doorframe and the rear upright of the night stand's curved side are cut and beveled, they are assembled with the bottom, top, and cleat for fit. The position of the cleat is marked on the underside of the top piece, then screwed into place. The lower end of the upright for the doorframe is lapped into the bottom, with its beveled edge flush with the arc of the bottom. The inner

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	10¼	54¼	Sides
1	¾	10	42¾	Innerside
1	¾	10	59¾	Top
1	¼	44½	59¼	Back (plywood)
1	¾	10	58¼	Shelf
1	¾	10	10	Divider (optional)
1	¾	10	17	Shelf
1	¾	9¼	40½	Bottom, blanket compartment
1	¾	11¾	40½	Sill, blanket compartment
1	¾	20¾	40½	Door, blanket compartment
1	¾	10	21¼	Side, night stand
1	¾	17	20	Bottom, night stand
2	¾	9½	21¼	Top, night stand (19 in. wide)
1	1¾	2	21¼	Upright, door frame
1	1½	2½	21¼	Rear upright, night stand
1	⅛	12½	21¼	Side, night stand (plywood)
1	¾	2	11½	Cleat, night stand side
1	¾	¾	9½	Cleat, door, night stand top
1	¾	11½	21¼	Door, night stand

upright is screwed to the inner edge of the inner sidepiece as shown, so that its beveled outer edge is flush with the arc of the circle cut in the bottom piece, into which it is lapped. The bottom piece can be fastened in position, flush with the floor ends of the sidepieces.

Next, the top of the night stand can be slid into place and fastened to the top of the short outer side, and to the top of the door's upright by means of small angle irons, which should be marked and screwed to the undersurface of the top before it is ready for final fastening. The rear edges are nailed or screwed through the two sides.

The ¼-in. plywood back panel is now fitted and screwed into its rabbets in the sidepieces. It is face-screwed to the top and all shelf edges.

The curved plywood side is ready to be bradded into position. Commencing at either end it is fastened along one vertical edge then steamed into position with a hot iron placed over a moistened cloth, as in pressing clothes. It is bradded at top and bottom progressively, as it bends into place.

The plywood doors are butt-hinged, with suitable catches attached along their outer edges.

Holes can be bored through the back panel at the shelf edges to permit the egress of electric cords from various appliances or the entire headboard can be wired to a central plug, which in turn is plugged into the room's electric outlet.

In the latter case, as shown in detail C, it will be necessary to make the sides deeper, if armored cable is used, unless it is decided to keep all cable above the height of the room's baseboard, whose thickness will be the distance of the rear of the headboard clears the wall. A frame 1½ in. deep, mitered at the top, can be nailed flush with the outer faces of the headboard to provide the necessary clearance for installing shallow appliance outlets in the back. The room's branch circuit should be checked to prevent overload. Unless other than the indicated appliances are to be used, 14 gage BX cable should prove satisfactory. An additional sheet of plywood can be added to cover the electrical installation, if desired

The night stand can, of course, be built into either or both sides, depending on the intended location of the bed with respect to the room's walls. A pair of these headboards will accommodate two twin beds placed close together. For a double bed the blanket compartment should measure 57 in. wide.

KITCHEN DUPLICITY

The departure of the "general factotum" or all-purpose domestic from the American scene appears to have erased the dining room from present-day home planning, requiring each family to face the problem of where to eat its meals. As already mentioned, many families of medium size who are accustomed to entertaining have set aside dining alcoves or semiscreened portions of their living rooms. Others have followed the line of least resistance and continue to consume all their meals on a table in the kitchen, or in a breakfast nook nearby. Whatever the decision, many homes are committed to a special setup for an early breakfast not too far from the kitchen stove.

Breakfast Nook. For a kitchen with a free corner or alcove 3 ft. 8 in. × 4 ft. 8 in. available, an important step saver is the old standby of two benches and a table seating four people for breakfast, lunch, or dinner. The construction of this compact dining nook (Figure 4.38) is extremely simple, involving a minimum of tools.

The rear inside vertical edges of the long sides of the benches shown in Figure 4.38 are rabbeted to take corresponding rabbets cut in both ends of each of the backpieces, before the side ends are glued up. The cleats for the seats are screwed on 16⅛ in. from the bottom edges, where the foot cleats are also attached from the inside; meanwhile the seats are glued up.

One half of the leg pattern can be laid out on one table leg piece, and after the outline is traced, both pieces can be sawed simultaneously. After they are sanded, they are glued up and the bottoms cleated; the tops must be clamped.

When the sides have dried they are cut to pattern, sanded, and the backs

Lumber List

·ces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
4	7/8	9	41	Sides, benches
4	7/8	9	24	Sides, benches (fronts)
6	3/4	8½	43½	Backs, benches
4	7/8	7½	42¼	Seats
8	3/4	1¾	14½	Cleats, seats and bench bottoms
1	3/4	26	40	Top, table
4	7/8	2½	21	Cleats, table top and leg bottoms
4	7/8	11½	29	Legs, table
2	7/8	2½	36	Stretchers, table

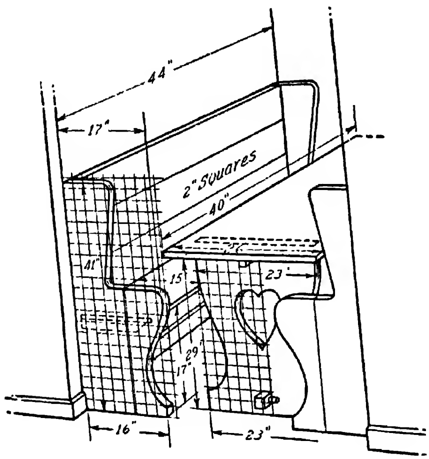


Fig. 4·38. Breakfast nook.

screwed into their rabbets. The seats are fastened to the top of their cleats and to the bottom of the back, from the rear.

To assemble the table it is only necessary to screw the legs to the outside edge of the cleats. The stretchers pass through their mortises in the legs and are keyed by ½-in. dowels, through holes drilled tightly against the outer leg surfaces.

Snack Bar. A modern development of the breakfast nook, the snack bar, takes its form from the quick-lunch counters prevalent throughout the country. It can be of most elementary design, built against any wall or alcove, as previously noted. Another popular form extends into the kitchen, at right angles to a wall, with its outer corners rounded into a smooth half circle, so that it can be used as

Courtesy The Glidden Company

FIG. 4.38*a*. Built-in nook.

a mixing or stacking counter between meals. Its top is usually covered with colored linoleum, to blend with the decorative scheme, held in place by rich chromium or aluminum banding around the counter's edges. Long-legged bar stools can be pushed underneath when not in use. These are of simple design, being little more than painted bookkeeper's stools with upholstered tops covered by imitation leather or glazed gingham-patterned chintz.

A novel built-in snack bar attached to a 2 in. × 4 in. cleat against the wall, is illustrated in Figure 4.39. Here the stools are in reality chairs, whose backs are built to form a continuous front when they are pushed against a longitudinal cleat along the underside of the counter. In this position the unupholstered seats form

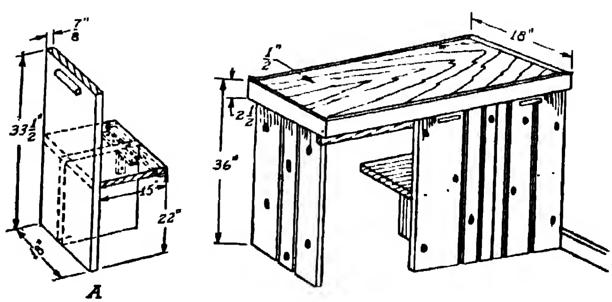


FIG. 4.39. Snack bar.

sections of shelving for emergency storage. Unless the latter is used with care, however, it may be necessary to provide bolts or hooks on the kitchen side to prevent accidents which may be caused by between-meal customers, who pull chairs out unexpectedly.

The construction of the chairs consists of simple butt joints, with cleats under the front ends of the seats to prevent splitting. The grain of the seats runs at right angles to the back, and the forward ends can be reinforced by heavy angle irons on both sides of the center "leg." The chair backs can be constructed of V-grooved knotty pine, as shown in the drawing, or of solid stock.

The counter or bar top is of ¾-in. stock cleated together with the end upright fastened to a 2 in $\times$ 4 in. cleat fastened sideways against the underside. The apron, which acts as a stop for tops of the chair backs, is lapped into the end upright, as shown.

The counter is edged by mitered ½-in. strips 2½ in. wide. These can be so fastened that they will project above the surface of the wooden counter top a distance equal to the thickness of the linoleum or other material to be used as a covering, so that the resulting top will be flush with the covered edges. The chair backs can also be covered with linoleum, or with hardwood plywood, or squares of striated plywood with alternating grains.

Folding Tables. Where space does not permit the installation of a permanent breakfast nook, counter or snack bar, a built-in folding table, strategically located, can be used to good advantage. A type presently popular is based upon the principle of the drop-leaf kitchenette table shown as optional construction to the closet-door compartment, earlier in this chapter (page 260). Hinged at the bot-

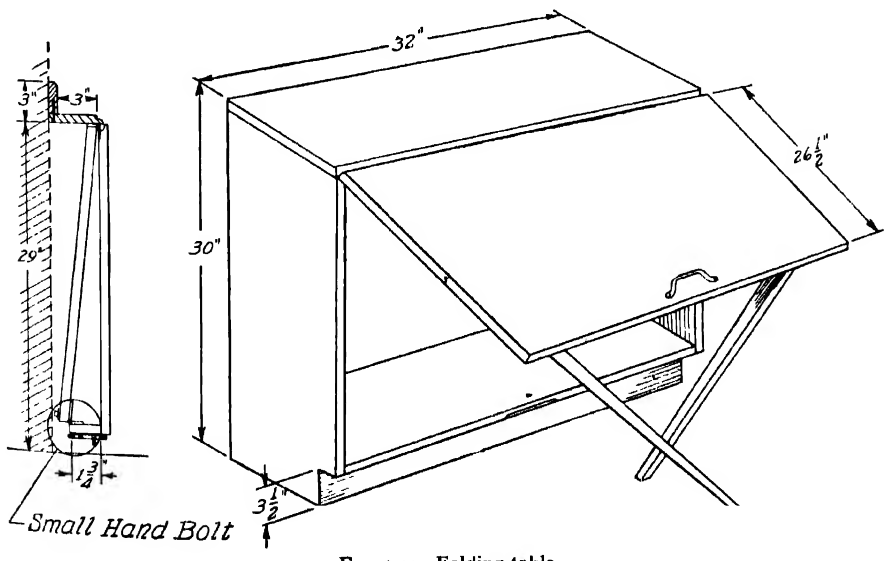


Fig. 4.40. Folding table.

tom, with a flat hinged leg that drops down to a vertical position as the table is lowered, this style of table is a satisfactory improvisation except for the fact that when it is "up," in its vertical position, it masks the shelves against which it is secured, and must therefore be lowered whenever access is desired to them.

The same is true of the table pictured in Figure 4.40 in so far as lower cabinet space is concerned, except that the latter can be built deep enough to house several folding chairs and still serve as a useful counter. As indicated, the top hinges upward, with two hinged legs that open downward as the top is raised. Bracket supports similar to those used in folding bridge tables can be used to insure rigidity.

An optional method is the cross section shown in A, which can be attached to the back of a door, or any unused low wall space. Here the legs come down as a pair, being secured in place by folding brackets.

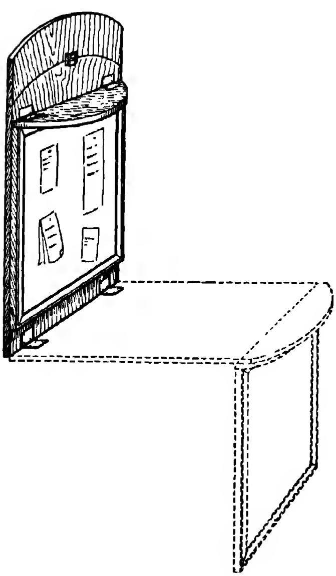


Fig. 4.41. Combination folding table.

For those who enjoy camouflaging their built-in appliances the folding table illustrated in Figure 4.41 will offer an opportunity to combine two conveniences. The table top, of any convenient size such as 2 ft. × 3 ft., is hinged flat against the wall 29 or 30 in. from the floor. Its supporting leg in the form of a kitchen bulletin board or blackboard, 29 or 30 in. high minus the thickness of the table top and its own semicircular pediment, is hinged 6 or 8 in. down from the outer edge of the table top. In the drawing the end of the table is cut in a semicircle to eliminate jutting corners in its open position. This accounts for the decorative semicircular pediment nailed to the top of the bulletin board as a firm support for the table when it is used as a leg.

For a bulletin board, soft wallboard is bradded or glued to a plywood backing and trimmed with a mitered frame of molding. If a blackboard is preferred, hard wallboard can be substituted and painted a flat black. The table can be locked against the wall with a cabinet catch attached to a circular piece of waste, or by means of a simple wooden coglike latch that rotates on a screw blocked up to the thickness of the table top. Needless to say no articles can be stored on the inviting shelflike pediment over the bulletin board.

An amusing "drop-leaf" table for the rumpus room is shown in Figure 4.42. Its projecting eyes are knobs for pulling the combination round and square hinged top down, so that the long "nose" can hinge down as the supporting leg.

Utility Cupboard. The utility of so-called utility cupboards and cabinets is often badly obscured by improper placement. The location of the kitchen utility cupboard under consideration (Figure 4.43) is of prime importance if it is to succeed in its mission. Predicated on a fair-sized kitchen having an outside wall, it is designed for a corner site, either near the rear door or against an outside wall.

Courtesy U.S. Gypsum Remodel Research House

FIG. 4.42. Folding table in rumpus room.

In such a position, when the Presiding Genius of the Stove is absent, and has locked the entrance door, packages can still be delivered by means of an outside covered door to the lower front compartment. The inner door to this package compartment, bolted on the kitchen side, prevents access to the kitchen while affording a protective covering for deliveries when no one is home.

Next comes a shallow receptacle for the ironing board, which hinges down onto its folding leg, as shown in Figure 4.43. The board is constructed so that it can be adjusted to the height of the operator, by means of butt hinges with a removable pin.

The remaining space on the opposite side can be devoted to cleaning materials,

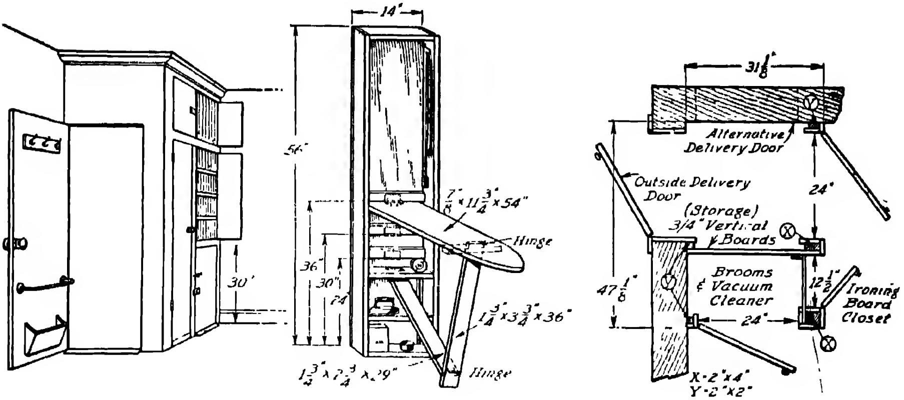


Fig. 4.43. Utility cupboard.

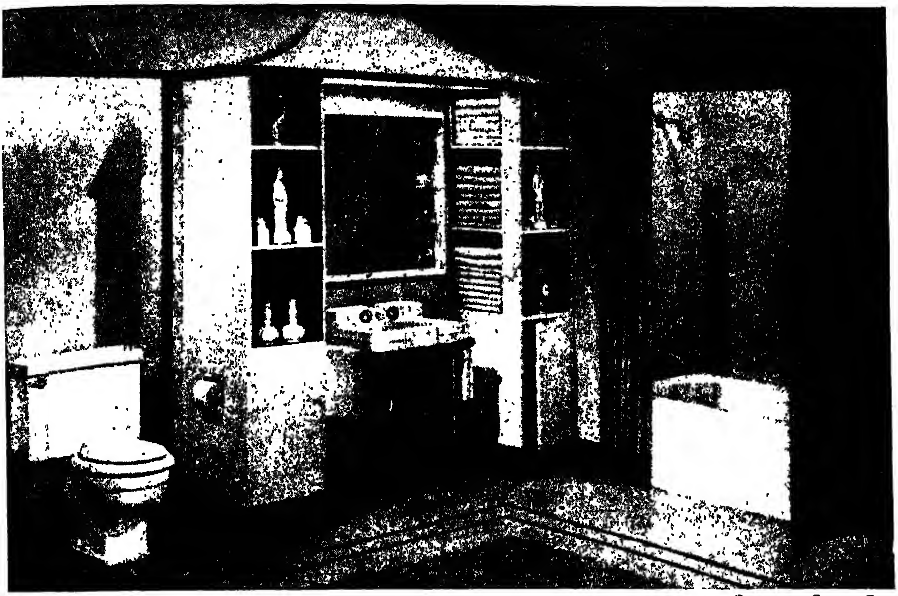
partitioned to care for available apparatus, such as vacuum cleaners and electric waxers, as well as mops and brooms. The back of the door has hooks for dresses and aprons, with a mirror on the front for necessary check-ups.

A framing of 2 in. × 4 in. pieces is first nailed in place. Vertical siding of wallboard or ¾-in. pine boards extends from floor to ceiling, with door openings framed by 2 × 4's or 2 × 2's. Partitions are of ¾-in. material on 2 in. × 2 in. framing, and the inside (kitchen) door to the outside compartment is of heavy, cleated construction, adequately weatherproofed around the outer edges. The cupboard door above it should match it in appearance and construction, from the kitchen side, providing access to a series of shelves above the package compartment. The entire cabinet can be painted or enameled to blend with the woodwork and decorative effect of the kitchen.

BATHROOM SUBTLETIES

Next to the kitchen, the modern bathroom offers perhaps the most fertile field for built-in utilities. Aside from the requisite plumbing fixtures, the careful location of medicine and cosmetic cabinets, linen cupboards, clothes hampers, drying racks, or dressing tables will return high dividends in added convenience.

Open Shelving. Gayly colored towels add to the decorative effect when displayed in piles on open shelves, which also render them readily accessible when needed. When not concealed by cupboard doors, the modern practice is to recess the shelving flush with the bathroom walls, with open outer corners, where possible, as shown in Figure 4.44. These are the familiar sunken boxes already described, with the tiling, wallboard, or plaster brought flush to their edges. With wallboard, chromium strips are available commercially to finish off the cut edges. The inside of the niches can be painted a contrasting color in the Colonial manner, or backed



Courtesy Crane Co.

FIG. 4.44. Built-in recess shelving, niches and cupboards in the bathroom.

with fitted sections of cheap mirrors, without frames. Medicine cabinets can be recessed flush with the walls in the same manner, with due regard for the studding.

Utility Cupboard. Unused bathroom corners offer an ideal location for combination cupboards or chests of drawers. Frequently these can be located at the open end of a built-in corner tub, or between the tub and the toilet. Constructed with 2 × 2's cleated to the wall, floor, and ceiling, as in the kitchen utility cupboard, their outer finish will most often consist of an enamel finished wallboard or tileboard. Figure 4.45 illustrates a combination in which the linen cabinet is built above a tilt-front clothes hamper. The latter is constructed along the lines discussed in Chapter 2, of a size to take a full week's "charge." An optional arrangement is to construct a series of drawers, or build the cupboard to fit an old chest of drawers, in place of the clothes hamper.

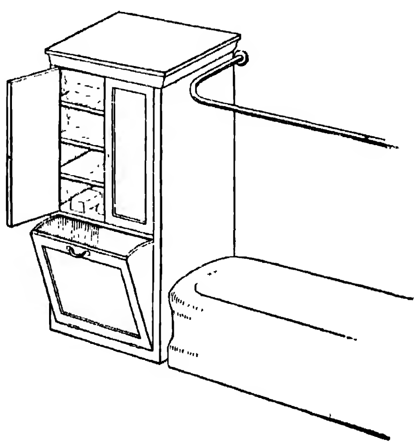


FIG. 4.45. Bathroom cupboard.

Dressing Tables. Even the men of the family will display enthusiasm for a

dressing table alongside the lavatory, provided it is kept clear enough of feminine fripperies to serve as a workbench for their shaving tools. This type of convenience can take the form of a removable table with four legs, built to fit the space, or a built-in type having two front legs with the rear apron cleated to the wall.

A more modern design presents the dressing table as a simple counter, without legs, as illustrated in Figure 4.46. An ideal method for supporting a corner next

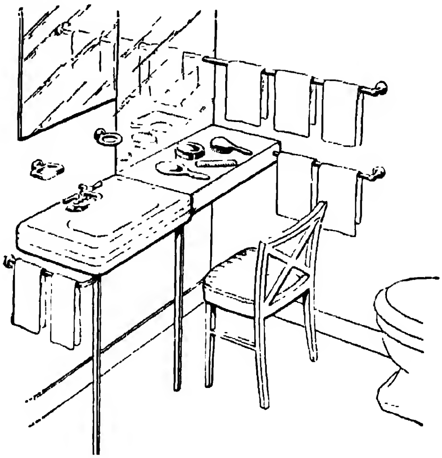


FIG. 4.46. Legless dressing table

to the lavatory is to bolt it through a hole drilled in the lavatory's apron. Failing this, heavy brackets must be employed, of either metal or suitably shaped wood. To be effective, these, like the rear apron cleats, must be located against studs in the wall. A linoleum top whose color reflects the decorative scheme will be most suitable for bathroom use. Its edge can be concealed by a band of veneer or plastic, which is cemented over the entire width of the counter's apron, when the latter is flush with the top edge.

Drying Rack. Rather than to attempt to change so basic a custom as the daily conversion of the bathroom into a lingerie laundry and drying room, the home mechanic will be better advised to construct a rack that will keep milady's garments reasonably clear of the bathtub, while drying out. This is not difficult where the tub is clear at one end, if a pivoted ladderlike rack is constructed, similar to the one pictured in Figure 4.47. A small wooden partition can be built at the end of the tub upon which the uprights of the rack will rest when they are in a vertical position. The tops of the uprights are pivoted to the ceiling by means of bolts thrust through chromium plated metal flanges, cut out and bent into U shapes as shown. If either the chromium is unavailable, or the rafters in the ceiling do not

occur at the necessary points, a wooden joint on a sufficiently large cleat running in either direction along the ceiling can be constructed as shown in the detail.

The rungs of the drying ladder can be plastic rods or chromium plated tubing, tenoned into place and held securely by chromium-headed screws. Long

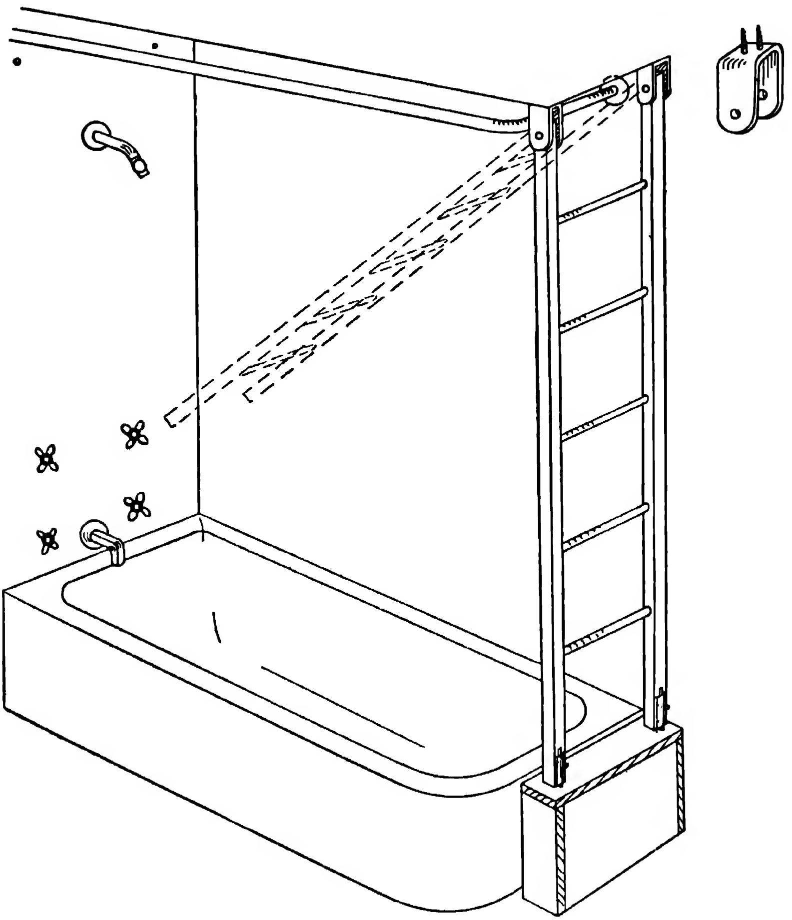


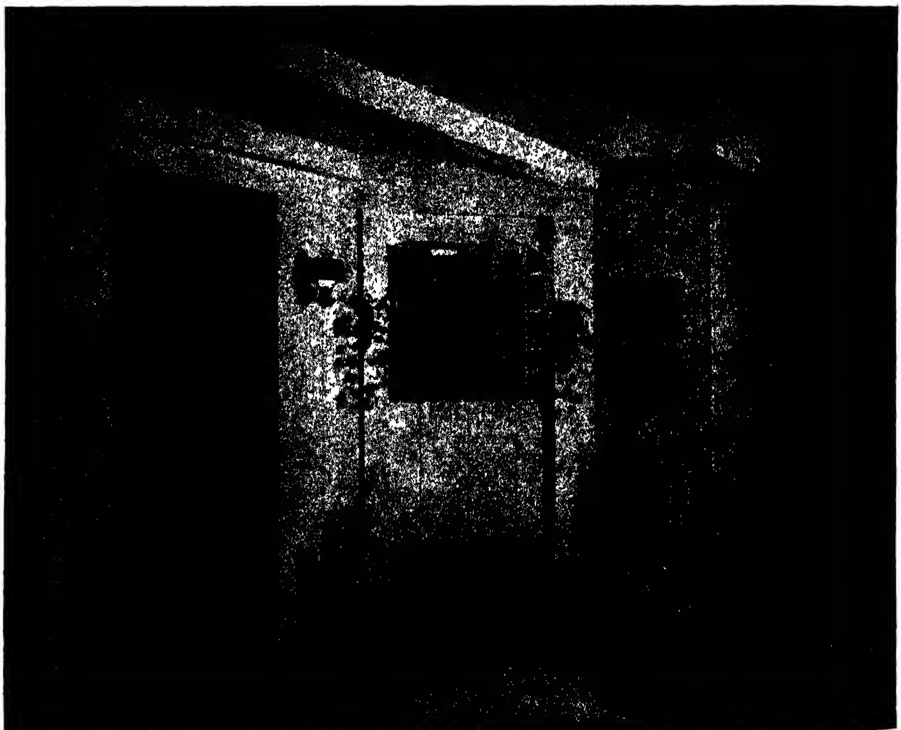
FIG. 4.47. Drying rod.

chromium-plated bolts attached to the back of the uprights sink into holes in the top of the small partition to secure the rack in its vertical position. The bolt housings are screwed carefully in place against the rear wall, as purchase for the bolts when the rack is pushed up. The upper portions of the bolt housings should be filed into a concave curve to prevent the bolts from slipping off, if jarred. When vertical, the rack serves as a towel holder; if preferred, the hinge attachment can be omitted and the rack used for drying clothes in the vertical position.

A more orderly arrangement results from the construction of an enclosed cabinet, which completely conceals the wet clothing during the drying process. Although such a cabinet can sometimes be constructed above an existing radiator, over which an inclined metal shield is fastened as protection from dripping, it will usually be necessary to build it wherever space is available. In this case the drying element will consist of an infrared lamp bulb, suitably located to prevent scorching. In any type of enclosed drying cabinet, every effort must be made to allow for passage of a maximum amount of air currents. To this end the door and sides have holes bored in various patterns, or contain brass grille inserts.

RUMPUS ROOM FAVORITES

The satisfactory remodeling of an unused portion of a basement into a bright, clean rumpus room or playroom, is heightened by the opportunities afforded for building in various conveniences, which not only bestow that coveted "custom-built" look, but also effectively increase the size of the usable floor space. Under these circumstances, it would appear incumbent upon the prospective home re-



Courtesy Western Pine Association

FIG. 4.48. Small corner bar.

modeller to plan the location of these conveniences before erecting the studding of new partitions, and especially when providing for doorways. No matter how rough the sketch, when drawn to scale it will prove invaluable to the amateur builder, both during the initial planning, for calculating the material requirements, and as insurance against the twin errors of costly omission and commission. Often the location of a door a few feet to the right or left will make or break a valuable wall space, together with its attendant possibilites for built-in utilities. The same is equally true of radiator installations, which often determine the final layout. Extra doors, when strategically located, often pay their way, as in the case of built-in bars. Indeed, Dutch or half doors, when provided with a suitable shelf, make ideal serving pantries or miniature bars in themselves, as in Figure 4.48.

Built-in Bars. A majority of modern home recreation rooms now feature a permanent bar built into a corner or an end of the room. Like their commercial prototypes—the milk bars, hosiery bars, necktie bars or ice cream bars—their primary objective need not necessarily be to dispense alcoholic beverages. In reality nothing more than counters at which "customers" can comfortably stand or sit, these home cola, snack, or cocktail bars are fundamentally of simple construction. The two basic considerations from the standpoint of utility are height and suitable counter space.

In general, a height of 42 in. will suit the average person, whether standing or sitting on a tall stool. The bar top should be allowed a minimum width of 12 in., the wider the better. Obviously it should be finished or covered with a stain- and alcohol-proof surface.

It is on the front and any exposed side that the builder can lavish his decorative ability. One of the simplest methods of finishing utilizes random vertical widths of V-grooved knotty pine, which blends so well with many rumpus room decorative treatments. A more striking but easily applied covering is the small tiled wallboard used in kitchens and bathrooms, which comes in a variety of glossy, enameled colors, or sized, ready for finishing. Padded leatherette is popular, either plain or quilted with upholsterers tacks, like a tufted chair back. Linoleum and Weldtex are interesting, and any of the hardwood plywood panels can be used for more formal effects, including plastic veneers, to be described later. A startlingly rich effect can be achieved by applying a lacquered film decalcomania simulating marble over ordinary lacquered wallboard or ¼-in. plywood.

The popular circular bar shown in Figure 4.49 is easy to construct once the arcs of the bar top and shelf have been cut out to the dimensions shown. A series of straight cleats are nailed to the underside of the bar top to permit a 1½-in. overhang when the six 8½-in. uprights are nailed or screwed to them. This overhang is also allowed at the ends to permit the sides to clear the baseboard of the room. Horizontal cleats nailed 18 in. above the floor ends of the upright members hold the circular shelf and furnish rigidity. Silhouettes can be jigsawed along the edges of the upright members before they are fastened in place.

This type of corner bar is most effective when a door gives access to it from

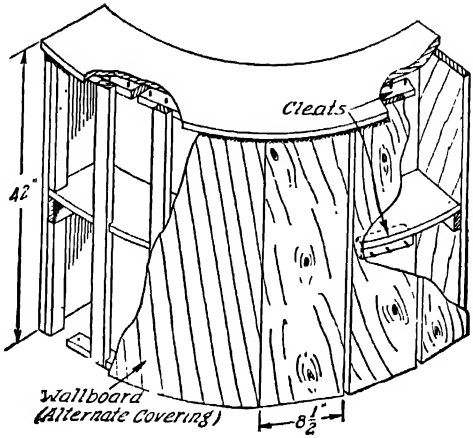


Fig. 4.49*a*. Pattern for front of bar.

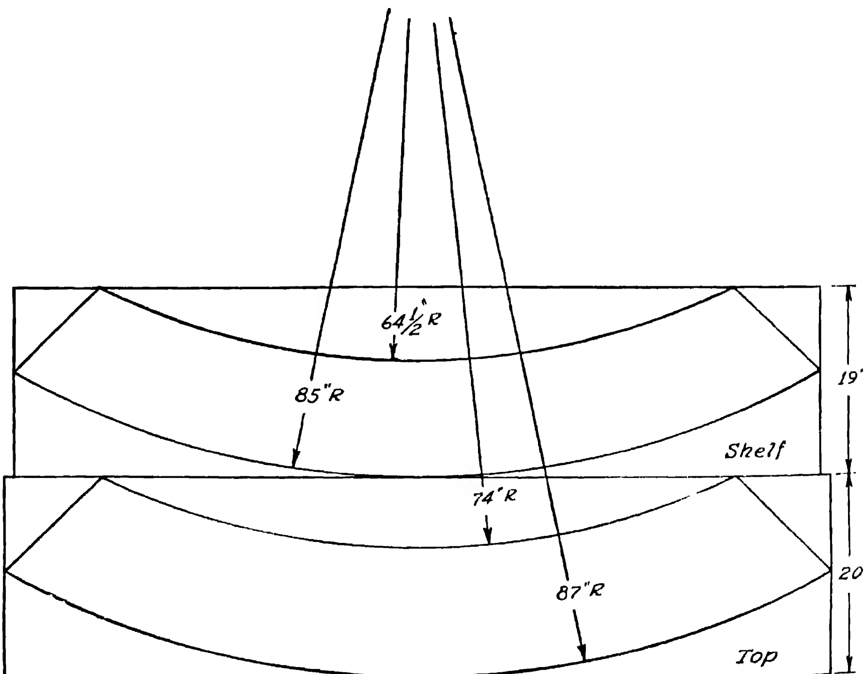


Fig. 4.49*b*. Pattern for bar top and shelf.

the rear. Otherwise it must be pushed forward sufficiently to permit entrance to its rear from one of the sides. Corner shelving for interesting glasses or miniature bottles will add a professional touch, which will be heightened by fastening a pair of matching mirrors to the opposing walls of the corner.

When floor space is at a premium, many home remodelers find it necessary to dispense with the luxury of serving space behind the bar by butting it against the back wall as a counter. In the bar shown in Figure 4.50 flexible wallboard

Courtesy Celotex Corporation

FIG. 4.50. Circular wallboard serving bar.

has been curved around a framework to carry out the illusion of a circular bar. The shallow wooden counter has a linoleum top, trimmed with stainless steel edging.

Washtub Camouflage. Often a plan for a small basement rumpus room, after successfully solving the problem of by-passing the cellar heating unit, runs afoul of that other unsightly household necessity, the pair of old-fashioned laundry tubs. On the theory that the best defense is to attack, if the location of these eyesores is such that they must be included in the space allotted to the playroom, a satisfactory solution is not only to make the best of the situation, but to so camouflage their appearance as to make them a center of interest. This calls not only for a suitable covering cabinet, but one which will possess definite eye appeal.

By constructing a well-fitting closed cabinet and finishing it in any of the methods discussed in the previous section on built-in-bars, a self-service snack bar results, which effectively hides the basic utility. The inclusion of unobtrusive casters permits its easy removal on wash days, when its dampproof top will be

unharmed by wet clothes, and it can be later utilized from the rear as a stand for the ironing board. As shown in Figure 4.51, shelves can be provided that project under the tubs to hold laundry supplies and the electric iron, if desired.

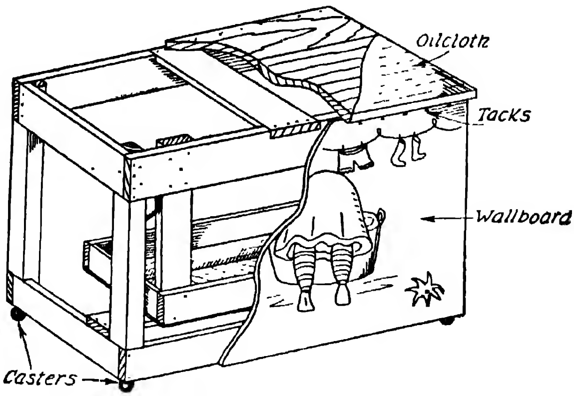


FIG. 4.51. Washtub cover.

The dimensions in general will be based upon a pair of old-fashioned tubs 48 in. long, 24 in. wide, and 34 in. high. The framing consists of butt-jointed 2 × 2's or 2 × 4's covered with wallboard, plywood, or whatever material is consistent with the planned finish. The top should be strong and well finished or covered, with due allowance for the height of the casters. A pair of hooks and eyes at the sides, under the overhang of the top or counter, will hold the cabinet securely in place when it is doubling as a bar. A built-in niche with shelves, or a shallow wall cabinet above the bar, will not only aid in the deception, but also provide valuable space for bottles, glasses, or condiments.

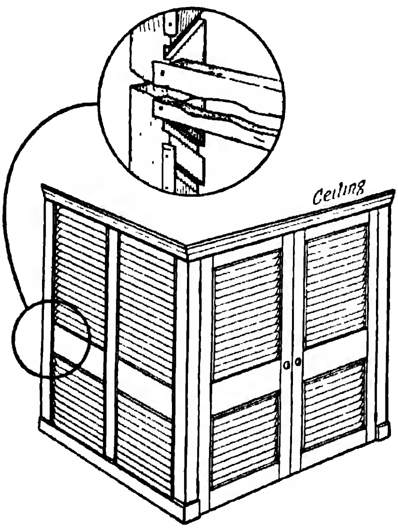


FIG. 4.52. Furnace enclosure.

Furnace Enclosures. When no amount of plotting or planning will yield a room of desirable size and still exclude the ubiquitous furnace, it too, must be treated boldly, like the washtubs in the preceding section. Whenever one side can be left open to the unfinished part of the basement, the problem of air circulation is simplified, since the other two sides can either be inclosed in knotty pine or wallboard, with a door at the front, or a fairly

tight lattice-work enclosure can be erected on studding, with lattice-work doors

In many cases, however, the furnace will have been located with its back near one of the basement walls, causing it to project well into the intended game room. Not many basement remodelers will be as fortunate as the man who was able to enclose his cellar heating plant with the tall shutters from his windows, which had become excess when they were replaced by a solid type.

A modification of this idea into a permanent enclosure constructed of fixed venetian blinds, will not only successfully conceal the most unsightly of furnaces, but also permit a free circulation of air. As will be noted in the detail in Figure 4.52, the immovable slats are housed in diagonal dadoes, which incline downward in the lower sections, permitting the cold air to enter at the bottom, and incline upward in the upper sections so that the lighter warm air can escape from above. The front can be closed with double doors, slatted like the sides. Half-round moldings along the sides not only finish off the work, but also serve as stops for the slats on the outside. Thin pieces of flat lattice slatting serve the same purpose on the inside, thus eliminating the necessity for gluing each slat.

HARLEQUIN FURNITURE

A study of furniture history reveals that multipurpose furniture is neither an invention nor a new development of modern times. Certain seventeenth century cabinetmakers produced pieces into which a whimsical secondary utility had been built for the edification of their capricious patrons, who promptly dubbed the resulting ingenuities as "harlequin," or "fantastic" furniture. Few fantastic qualities but much ingenuity is displayed in modern conceptions of spacesaving, double-duty furniture. Although not usually classed as built-in furniture, because of their mobility, these dual-purpose pieces possess a basic kinship to built-in furniture because of the versatility that was designed and literally built into them. Therefore, the following examples are included to augment those already discussed.

End Table Sewing Cabinet. For the busy housewife to whom a sewing room or alcove is not available, the popular step end table described in Chapter 2 (page 89) can be modified to house her sewing and darning utensils (Figure 4.53). With the middle step omitted and the floor hinged to expose rows of thread and darning cottons, there is still room for thimbles, needles, scissors, tape measure, darning egg, and socks, without disturbing a lamp or ashtray on the top shelf, or books on the shelf below.

After the legs are tapered to ⅞ in., a rabbet ⅜ in. wide is cut in the aprons, before they are doweled into the legs. The plywood bottom is cut out to fit around the inside leg corners, then glued and bradded into its rabbet, as indicated in Figure 4.53.

The fixed back section of the first step is rounded on its three outer edges and fastened to the rear of the aprons with a ½-in. overhang. The uprights for the top cut are then clamped together and a curve cut in their front edges as shown.

LUMBER LIST

Pieces	Thickness, in inches	Width, in inches	Length, in inches	Description
4	1¼	1½	15	Legs
2	⅝	3½	22¼	Side aprons
2	⅝	3½	14¼	End aprons
1	⅜	15	23	Bottom (plywood)
1	¾	16	18	Hinged cover (step)
1	¾	10	18	Back section, step
2	⅝	10	10	Uprights, top step
1	¾	6	18	Top step
2	⅝	2½	13½	Spool-holder strips
1	⅝	1	12½	Binder, spool-holder strips
2	3/16	—	13⅛	Spool holders
2	⅜	—	13⅛	Darning cotton holders

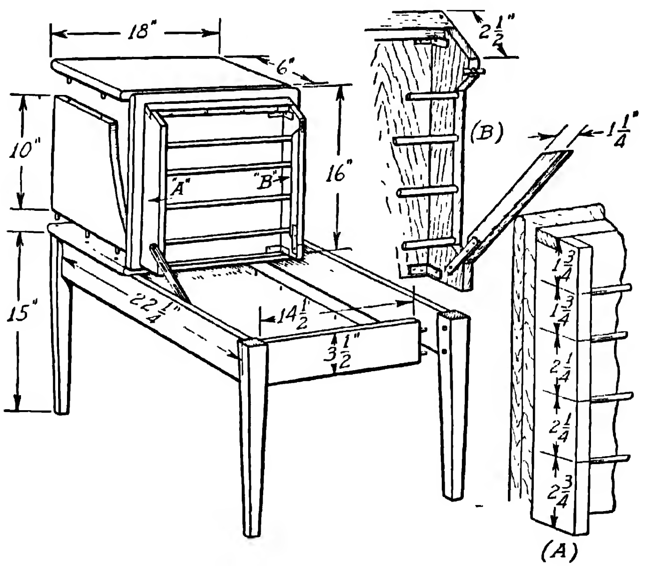


FIG. 4 53. End table sewing cabinet.

They are fastened in place with ¼-in. dowels ready to receive the top step. After the latter has had all four edges rounded and smoothed, it is doweled in place with 3/16-in. dowels.

The hinged top, after being tried for fit and overhang, has its edges filed and

smoothed and is placed upside down on the bench. The side strips of the spool-holding compartment are cut off at a diagonal to insure clearance of the front apron when the lid is raised. The binder is lapped into the diagonal ends, as shown in the drawing.

Holes are bored halfway through the sides for the two sizes of dowels used as spool spindles, at the intervals indicated in detail (*A*). One side is jigsawed and ripped as shown in the detail, to permit removal of the spindles and spools. A pair of straight repair plates fastened with one screw to the main section of the side act as pivot hinges; the moving part is locked in place in the closed position by a butterfly nut, as shown in (*B*).

The compartment, when assembled, can be angle-ironed to the underside of the hinged lid in such a position as to clear all aprons as the lid is raised. The latter is then butt-hinged to the fixed, rear step. A folding lid support can be fastened in place to prevent the lid from closing unexpectedly.

Table Kitchenette or Cellarette. The bedside table described in Chapter 2 (page 130) can be easily modified to open up as a small snack bar, cellarette, sewing cabinet, or holder for a record player. As shown in Figure 4.54, it is

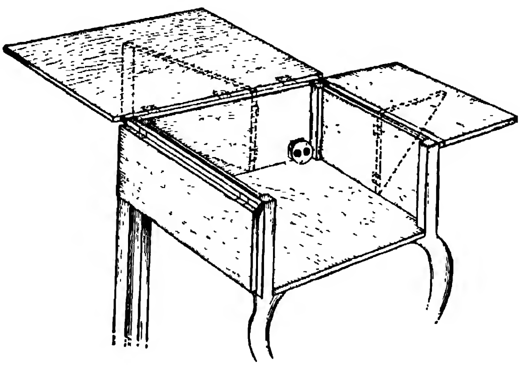


FIG. 4.54. Table kitchenette.

necessary only to hinge the top, provide a gateleg to hold it, and to reconstruct the front into a dropleaf.

If the top is to open up against a wall, instead of folding all the way back to act as a serving counter, the gateleg may be dispensed with; otherwise it will be necessary to prevent the table from tipping over, as would be the case if a hinged bracket is relied upon.

The drawer fronts can be camouflaged in a single solid piece by gluing thin imitation drawer and top rails in the proper positions, and adding handles. The front edge of the solid bottom must be recessed the thickness of the drop-leaf front, which is hinged to it, and held horizontally by folding brackets.

Added serving surface is secured by the addition of two side drop leaves, which

are attached to ¾-in. projecting strips along the top edges of the side aprons. As shown in the drawing, hinged wings or brackets, ¾ in. thick, swing out to support these leaves when open. The hinged table top is wide enough to overhang the side and rear projecting strips as well as the drop leaf edges.

The inside of the snack bar should be lined with asbestos or other fireproof material, if heating apparatus is to be used. For electrical units, a double convenience outlet can be attached to a side apron with a flexible wire and plug through to the outside, for attachment to the nearest base plug.

As a cellarette, it will be found that the original measurements were deep enough to accommodate the average-sized bottles. Here the lining should be of some acid- and alcohol-proof material such as formica, Micarta, stainless steel, or copper.

The gateleg is made of ¾-in. stock and is mortised and tenoned or doweled to an apron that is three quarters of the length of the back apron of the table. This apron is hinged to the back and hides under the overhang of the top when not in use.

Utility Desk. For the utility room a kneehole desk whose top can be lifted off and tucked away into a closet while the drawer compartments serve as bedside stands or commodes should be just what is needed. Although the drawer compartments shown in Figure 4.55 are constructed in the manner of the bachelor

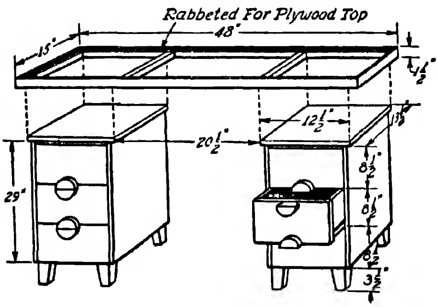


Fig. 4.55 Utility desk.

chest of Chapter 2 (page 136), if assembled from stuck panels, the construction will be almost identical with that of the double desk in the same chapter, (page 134). A solid bottom is substituted for the conventional lower frame, so that the four tapered modern legs can be doweled into recessed positions. Drawer guides are attached to the bottom edges of the drawers whose fronts lap over to cover the recessed rails, including the front edge of the bottom.

As illustrated in the drawing, the plywood top is rabbeted into the mitered frame which forms the heavy-appearing edges. The two dividers not only add strength to the top, but are carefully fitted to serve as cleats holding the tops of

the two commodes in place when they are used as a desk. The plywood top can be covered with imitation leather, linoleum, or paint.

Lumber List

Top

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	1½	48	Sides, top frame
2	¾	1½	15	Ends, top frame
2	¾	1	13½	Dividers, top frame
1	½	14½	47½	Top (plywood)

Commode (1)

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
1	¾	12½	13½	Top
2	¾	13	24¾	Sides
1	¾	1½	10	Top rail
1	¾	10	11¾	Bottom
2	¾	1½	10	Drawer rails
4	¾	1	10	Drawer slides
6	⅜	½	11½	Drawer guides
4	1⅝	1⅝	3½	Legs
3	¾	8½	10	Drawer fronts
6	⅜	7¾	11½	Drawer sides
3	⅜	7¾	8⅞	Drawer ends
3	¼	8½	12	Drawer bottoms (plywood)

Ironing Board Table. The knockdown, heavy-duty kitchen table described in Chapter 2 (page 162), or any long table having a 4½- or 5-in. apron, can be used to house a built-in ironing board. As shown in Figure 4.56, all that is necessary is to provide an exit and suitable means of movement.

In the drawing, roller-skate wheels are suggested, although ribbon spools or any suitable rollers can be pivoted, by means of screws and washers, to an axle (A), and guided by pairs of hardwood runners screwed to the inside of the side aprons. The axle, which must be accurately measured to insure that the rollers neither run off their lower tracks, nor bind against the aprons, is screwed to the end of the ironing board, being reinforced with flat angle irons, as shown in the detail.

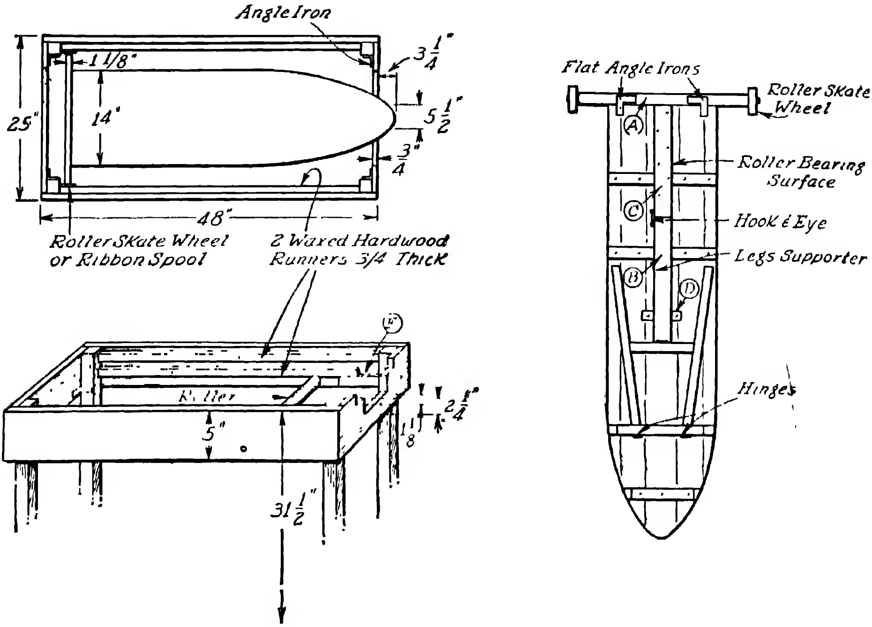


FIG. 4.56. Kitchen table with ironing board.

The ironing board has a pair of folding legs tenoned into a top crosspiece, which is hinged to a cleat, as indicated. Depending on the height of the table and ironing board, a support (B) is measured so that when it is hinged to the spreader between the ironing board legs, it can be wedged against cleat (D). The free end of support (B) should be cut at an angle to fit against the cleat when the legs are down. In its closed position support (B) is held up by a hook and eye to cleat (C), which is thick enough to lap over intervening cross cleats and provide a surface to ride over the long roller between the side aprons of the table. The length of the board will of course be determined by the length of the table, unless the latter is especially constructed. In any event, one side apron will have to be removed in order to insert the axle, and the table top must be removed in order to cut out the exit in one end apron. A length of curtain pole or other suitable roller is pivoted near the outer end of the table a distance down from the lower edges of the upper runners or track, equal to the total thickness of ironing board, cleats, and legs.

In order to hold the rear end of the ironing board firm while it is in use, the ends of each of the lower runners in the side aprons are cut off at the open end of the table (E) an amount equal to the diameter of the two small rollers pivoted to the ends of the axle. A small section of runner is screwed under these cut off ends to hold the rollers when they drop off the long runner. When returning the

board to its position within the table, it is necessary only to raise up the rear end until the rollers engage the upper long track, whose end corners should be beveled off.

Modern Breakfront. Although the dining table is often requisitioned for work or study between meals, the average buffet remains sacrosanct as a repository for china, glassware, silver, and linens. It is in an attempt to expand the uses of this single-minded piece of furniture that the multipurpose breakfront (Figure 4.57) described below is presented. With its four textured cupboard doors closed,

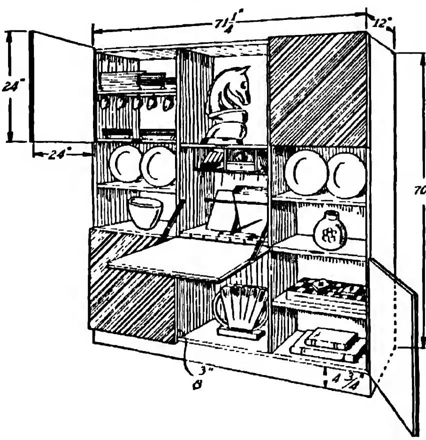


Fig. 4.57. Modern breakfront.

it offers shelves for the display of selected china and glassware, or *objets d' art* in the modern manner. Extra shelves and drawers can be fitted into the cupboards in each corner, for the storing of china, glassware, silverware, linens, electrical appliances, or bottled goods. The center flush panel is hinged at the bottom to form a drop-leaf desk.

The breakfront shown in Figure 4.57 is of conventional construction throughout. The dimensions given in the lumber list are for butt joints, suitable for a paint finish; the more craftsmanlike blind dadoed job will require an additional ¾ in. for all but the mitered corners of the outer carcass. To permit clearance for the dropfront desk, it will be noted that the two center shelves must be located ¾ in closer together than neighboring shelves to right and left. For the same reason, all five panels can lap over onto the vertical partitions only half way, i.e., ⅜ in. Before the partitions are fitted into their dadoes and the corners glued, ½-in. rabbets are cut around the inside of the rear edges of the frame to house the ¼-in. plywood back strips. An optional method is to cut the plywood backing ¼ in. scant along the sides, and screw it directly to the back edges, without recessing it. The base has mitered corners reinforced by corner blocks.

The cupboard doors are fastened in place with invisible link hinges and bullet

LUMBER LIST

Pieces	*Thickness, in inches*	*Width, in inches*	*Length, in inches*	*Description*
2	¾	12	70½	Sides
2	¾	12	71¼	Top and bottom
2	¾	11¾	69	Partitions
12	¾	11¾	22½	Shelves
2	¾	4¾	69¾	Base, front and back
2	¾	4¾	11¼	Base, sides
5	½	24	24	Doors (plywood)
5	5/16	24	24	Doors (veneer—plywood)
2	¼	24 and 48	72	Back (plywood, 72½ in. × 72½ in.)

catches. In lieu of knobs, light fingertip recesses are scooped out of the partition sides. The desk is invisibly hinged at the bottom, being held in horizontal position by folding brackets or chains. The five doors can be made of plywood having a hardwood veneer face, or with a grooved Weldtex veneering. When the latter is cut into squares of alternating diagonals, as shown in the drawing, the effect is very interesting; a more economical method would be to cut the squares with the grain running vertical in the four cupboard doors and horizontal in the desk, or vice versa. It can be cemented over the plywood backing with brads inserted in its striations.

Shelves and drawers can be inserted in the cupboard and desk compartments to suit the articles that are to be stored in them.

5

FURNITURE FINISHING

ALTHOUGH in his selection of woods the amateur craftsman is likely to be more keenly conscious of grains and patterns than the average furniture owner, it often happens that he becomes so immersed in his hobby of construction and joinery that the matter of finish receives but scant consideration, or becomes confused by well-meant advice. While it is true that the most expert finishing schedule cannot make a silk purse out of a second-rate cabinetmaking job or inferior materials, nevertheless a good finish can cover a multitude of sins. This is particularly true of enameled, lacquered, or decorated surfaces, where a liberal use of crack filler can be rendered invisible under a smooth opaque film. All furniture finishes can be roughly divided into two main processes, the opaque finish, whose purpose is to hide, and the transparent finish, which is used to reveal and enhance the natural grain of the wood. Before discussing either of these procedures, however, there are several general requirements common to all types of finish that should be introduced.

Preparing the Surface. Any finishing schedule will be greatly facilitated if each member of the piece has been thoroughly sanded prior to assembly. Otherwise considerable difficulty may be experienced in smoothing down inaccessible parts such as inset rails, panel corners, turnings, or carvings.

As emphasized in Chapter 1, the final sanding of fine cabinetwork should employ a fine abrasive, not coarser than a 3/0 garnet finishing paper. For rounded and inaccessible surfaces such as carvings, No. 00 steel wool is more flexible, although it does not cut as well. No. 6/0 waterproof paper and water are used between coats, and No. 1/2 pumice stone lubricated by water is favored for rubbing the final coat, rather than for use on a raw wood surface.

Absolute cleanliness must be achieved before the application of any finish coat is even contemplated. After all possible sanding dust has been removed with a soft dusting brush or compressed air, the parts should be wiped with a lintless rag moistened with turpentine, benzine, naptha or lacquer thinner. A light wash of this nature also insures that the work will be free from grease, much of which may consist of invisible deposits that occur in handling.

As will be discussed under varnish finishing, the sanding dust composed of

grains of abrasive and wood flour is not the only enemy to a good finish. A normal load of dust in the air is always present in varying degrees, ready and eager to settle and bed down on a "tacky" surface. After the finishing room is rendered as dustless as possible, the windows should be closed and the floor mopped. Newspapers laid on the floor and sprinkled with water will help, and strong air currents should be discouraged. The room temperature should be at 70° for best results, since neither enamels nor varnishes dry in a temperature that is cold or humid.

Mixing. The opaque finishes consist of hiding pigments held in liquid suspension. Enamel is pigment ground in varnish; paint consists of pigment ground in linseed oil; lacquer has its pigments ground in solvents blended with nitrocellulose to form lacquer; synthetic finishes employ pigments ground in a synthetic resin. In all cases the pigments, by reason of their weight, attempt to settle to the bottom of their container where they form a thick sediment. To keep them in suspension, therefore, requires thorough, repeated agitation to maintain the necessary consistency.

Craftsmen use a variety of devices for paint mixing, from hand paddles and bent wires inserted in hand drills to mechanical tumblers. Whatever the method it must be thorough, for whether the protective finish is prepared at home or purchased ready-mixed, the pigments will settle to the bottom of the container when not in use. To remedy this condition the best method is to pour off the liquid into a clean container and thoroughly stir the muddy residue. During the stirring small portions of the poured-off liquid are added until the proper consistency is obtained, and the pigment is thoroughly broken up in suspension. In all finishing operations it will be found next to impossible to maintain too large a stock of clean empty tin cans, cups or screw-top Mason jars. With their airtight rubber rings the latter afford excellent storage, when the friction top containers have become damaged or too gummy to exclude air when closed.

Brushes. The home craftsman who uses the brushing method to apply his finishes has learned from sad experience to treat his brushes as considerately as he customarily cares for his edged tools. Among other things he has learned that the best grade of brush is most economical in the end, and that to use a small brush to cover a large surface is as unwise as the reverse procedure. An assortment of brushes ranging in width from ½ in. to 2½ in. will insure an economical loading of the proper amount of liquid for the job.

Fig. 5.1. Varnish brush.

The best all-purpose finishing brush is often marked "XXX," with black Chinese bristles cut with a full-cup chisel edge as shown in Figure 5.1. The "XXX" marking indicates that the bristles are set in three rows; single or double rows are thinner in body, providing greater flexibility for brushing around turnings or moldings. The chisel end of a good brush is built into it by the proper arrangement of long and short bristles, whereas cheap brushes usually display a

chisel edge made by trimming the ends of the bristles. This practice removes the paint-holding flag ends that are visible in brushes of good quality. Brushes come with varying bristle lengths, the longer ones holding more fluid but affording less control.

Care of Brushes. Much time, money, and irritation can be saved by the proper care and cleaning of finishing and painting brushes. Because of the different liquid vehicles involved, separate brushes should be reserved for enamel, paint, lacquer, varnish, shellac, and stains. The best policy is to clean each brush immediately after using it and prepare it for dry storage or hang it in its proper liquid for further use.

The proper cleaning solvent will depend upon the finish used; paint and varnish brushes can be cleaned with turpentine or benzine, but shellac brushes are cleaned with denatured alcohol, and lacquer brushes with lacquer thinner. Water stains can of course be cleaned off with water, but non-grain-raising stains require a special solvent issued by the manufacturer. Whatever the solvent used, it should be worked in all the way up to the heel of the brush with the fingers, if necessary, and applied unstintingly. A steel brush or an old table fork will be found useful for loosening up any gummy residue.

Paint and varnish brushes that are to be used again within a reasonable period can be suspended in their liquid solutions. Shellac and lacquer brushes should be stored dry. To keep out dirt and retard evaporation of the fluid, containers having tops should be selected and modified as suggested in Figure 5.2. Whatever the method of suspension employed, it should insure that the bristles do not rest on the bottom of the container where they are liable to become permanently bent. The liquid should be maintained to the middle of the brush ferrule and consists of a half-and-half mixture of raw linseed oil and turpentine for paint brushes, or of varnish and turpentine for varnish or enamel brushes.

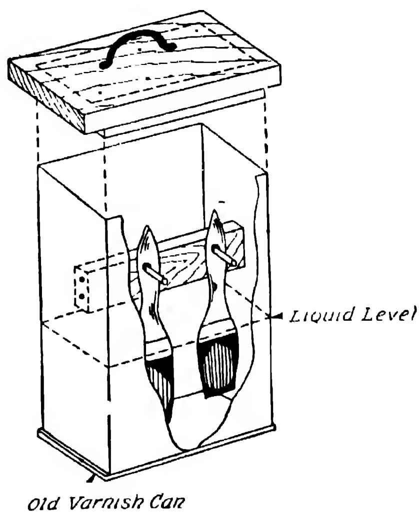


FIG. 5.2. Brush keeper.

Prior to dry storage, after the brush has been thoroughly cleaned in solvent, it should be washed with soap and water, followed by a rinsing in clear water. When dry, the bristles are dipped in linseed oil and the brush can then be wrapped in paper to keep out dust and dirt. Waxed paper from commercial loaves of bread makes a good wrapper, and care should be exercised that the brush is kept flat to prevent "warping" during long storage.

For the best results new brushes should be broken in before using. After working the ends of the bristles against a board to force any loose hairs forward, they should be combed out smooth and immersed in linseed oil for 12 hours or more, in order to insure ease in later cleaning. Before using the brush most of the oil can be squeezed out with a straightedge; the remainder can be removed centrifugally by spinning the handle between the palms of the hands, while the brush extends into a wide, empty container to prevent spattering.

Brushing Technique. The successful application of a brushed-on finish is dependent in great part upon the manner in which the brush is handled. Selection of the correct size of brush will insure the application of the proper amount of liquid, which is a strong factor in eliminating "holidays" or skipped areas, as well as in preventing double coating. In loading the brush it is best to dip only about one third of the length of the bristles—under no circumstances up to the ferrule. The habit of wiping excess paint off against the edge of the can each time the brush is dipped, not only bends the end bristles but causes an accumulation of thick pigment under the rim of the can, which eventually drops into the liquid in the form of blobs. A strike wire fastened across the can is a much better practice.

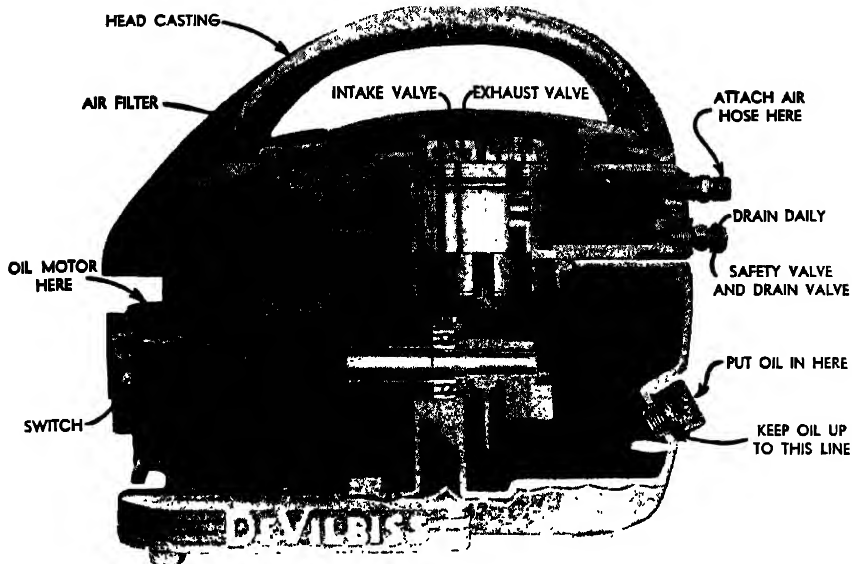
Paint finishes are usually brushed out; enamel, varnish, and shellac finishes must be flowed on, and lacquer while habitually sprayed, is procurable in a brushing mixture. On flat surfaces paint finishes should be thoroughly brushed out until the covering film is of uniform density, working outward toward the edges to prevent accumulations along the sharp edges. It is always good practice to start each newly loaded brush on the bare wood, brushing into the lap left by the previous brushful. Cross brushing large areas eradicates "holidays" and evenly distributes the film of finishing material. It is always wise to rehearse the initial brush strokes of a finishing job on waste pieces of the basic material, or at least on a piece of wrapping paper.

SPRAYING

Of recent years the perfection of portable spraying equipment within a moderate price range has popularized the spray finish among home craftsmen Compact outfits, with compressor and motor housed in one unit, are available, and may be used equally well with light or heavy-bodied liquids.

Spray Guns. Certain fundamental differences are built into the various types of spray guns. In the matter of air pressure, guns may be of the bleeder or nonbleeder type. The bleeder type is required where the compressor unit is not equipped with a pressure relief valve, a continuous "bleeding" of air through the spray nozzle aperture being relied upon, after sufficient air pressure has been built up. In the nonbleeding type, no air passes the nozzle until the trigger is squeezed.

Another distinction between spray guns depends upon the method employed to feed the nozzle. Suction-feed guns create a vacuum in the cup or paint reservoir,



Courtesy The DeVilbiss Company

FIG. 5.3. Typical modern streamlined portable air compressor.

which pulls up light liquids to the nozzle. This type, however, is not so efficient in sucking up heavy-bodied fluids. In pressure-feed guns compressed air entering the cup pushes the liquid into the nozzle, enabling this type of gun to deliver a uniform amount of liquid under a given air pressure.

Courtesy Binks Manufacturing Company

FIG. 5.4a. Non-bleeder external-mix pressure-feed gun.

The cap at the nozzle of the gun mixes air and liquid either internally or externally. The external-mix cap usually has two hooded side ports (*A* in Figure 5.4*b*) which aim twin jets of compressed air at the atomized mixture leaving the central orifice. This produces the fan-shaped pattern so economical for spraying large areas. The internal-mix cap has a long narrow slot to fan-shape the spray that has been partially atomized by the venturi action behind the nozzle. The external-feed cap is supplied on both the suction- and pressure-feed guns, but the internal-mix cap can be used with only pressure feed. Requiring less pressure, it is popular with small units, but is liable to clog with fast-drying mixtures.

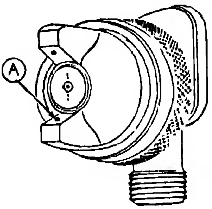


FIG. 5.4*b*. External mixing cap.

Spraying Technique. When properly applied to flat work, most guns produce the fan pattern illustrated in the detail in Figure 5.5. It averages about 6 in. wide when the gun is held 6 to 10 in. from the surface to be sprayed, as indicated in the photograph. External mix guns can usually be adjusted to produce a round

Courtesy The DeVilbiss Company

FIG. 5.5. Correct spraying technique.

pattern for a concentration of liquid on small areas or modified by blocking off the side ports with friction tape.

Held at a uniform distance from the work, the gun is swept across and back at an even rate to make one coat. During each sweep the gun nozzle must be held parallel to the sprayed surface; arcing will produce a disproportionately heavy deposit in the center of the stroke. In order to make the most of the fan-shaped spray pattern, the gun should be triggered as the stroke is begun, ahead of the work, and released at the completion of the stroke, after the nozzle has passed beyond the surface being sprayed. A second coat applied in vertical laps will insure good coverage. Practice is the secret of good spraying, and can be exercised on scrap material or wrapping paper. Examination of test patterns before the finish coat is applied may result in necessary adjustments that will eliminate a later sanding off of an unsatisfactorily sprayed surface.

Figure 5.5 illustrated the correct fan pattern, fairly uniform in shape, with a compact center blended or "feathered" out to fine dots at the edges. In Figure 5.6 four incorrect patterns are shown. In detail A the small dark center quickly fades into rough gobs of material, indicating a failure in atomization which, if aggravated, will almost surely produce "orange peel." Correction consists of either thinning the liquid or increasing the air pressure. The shapes indicated in B and C are common distortions caused by a dirty gun. The split pattern in D is caused by excessive air pressure.

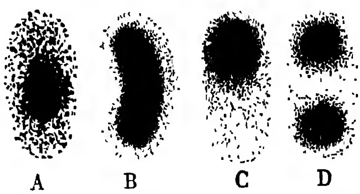


FIG. 5.6. Spray patterns. A, Heavy center; B, Peanut; C, Heavy end; D, Split spray.

Common Failures.

"Piling" of the sprayed finish is caused by moving the gun too slowly or too near the surface.

"Running" results from too thin a liquid.

"Sags" are the result of too thick a liquid, too close a stroke, or improper triggering.

"Pin holes" often occur when the gun is held too close to the surface, or from too much air pressure.

"Misting" is due to excessive air pressure, a too thin fluid, arcing the gun, or holding it too far from the surface.

"Floating" is usually the result of a poor mixture.

Viscosity. As noted above, it is evident that in addition to manual ability to control properly the sweep of the gun, the liquid being sprayed must be of the correct body or viscosity. Many craftsmen are satisfied with a crude paddle test, during which they dip a thin strip of metal into the liquid up to a predetermined mark. When the "paddle" is withdrawn, the behavior of the liquid reflects its

relative viscosity. An excessively thin mixture will immediately run off the end of the paddle, whereas too heavy a liquid will sag down in drops before it runs. A mixture that is close to the proper viscosity will start to run but has sufficient body finally to flow in a series of waves.

A more accurate test, which can be applied repeatedly, is by means of glass viscosity tubes. If these are not available, a half-dozen test tubes of identical size (about ½ in. × 4 to 5 in.) will prove satisfactory. Corks of identical size should also be procured. Each tube is filled with the liquid under test to within approximately ⅜ in. of the end of the cork, which has been previously fitted and marked so that all are inserted to the same depth. When the corked tube is inverted, the air space under the cork becomes a bubble, which travels to the upper (closed) end of the tube. The time it takes the bubble to traverse the length of the tube is the measure of the viscosity of the liquid.

In order to obtain a sealed sample for measuring unknown mixtures, a series of test patterns must be sprayed on wrapping paper or scrap material. The cup is filled half-full of a mixed liquid that is known to be too heavy, and its pattern sprayed. Small amounts of thinner are added successively and a pattern sprayed for each until a pattern finally registers the proper viscosity. A sample of the correct liquid is sealed in a viscosity tube as the "master" or "pilot" sample for future mixtures employing this type of solvent.

Cleaning. Suction-feed guns are a pleasure to clean. All that is necessary is to unscrew the gun from the cup, stop up the nozzle with the fingers, and pull the trigger to force out the remaining fluid. If the fluid tube is inserted in a container of solvent and the trigger squeezed several times as in Figure 5.7, the gun will clean itself.

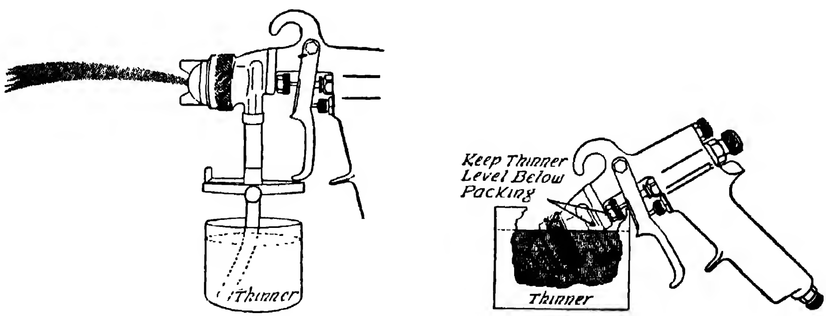


FIG. 5.7. Cleaning the spray gun.

Pressure-feed guns are cleaned in the same way except for the fact that the solvent is poured into the metal, pressure-resistant cup, which must then be screwed tightly in place before compressed air is triggered in.

This light cleaning should be augmented by a periodic dismantling of the air cap, fluid tip, and the needle valve with its control needle, and immersing them

in solvent. Under no circumstances should solvent be allowed to come into contact with the oil or packings of the working parts.

Summary. In conclusion it should be borne in mind that in finishing fine furniture or cabinetwork, cleanliness is next in importance to a craftsmanlike finish.

In the first place, the work itself must be so clean that no wood or sand dust remain to adulterate and discolor the finish to be applied.

For the same reason brushes or spray guns that apply the finish should be immaculate.

Finally, maximum efforts should be exerted to eliminate from the air dust whose settling would mar an otherwise perfect finish.

FURNITURE FINISHING TECHNIQUE

In addition to cleanliness of the surface, tools and air and repeated stirring of the finishing fluid, following a methodical procedure in enameling or painting furniture will obviate considerable unsatisfactory retouching. In this connection a good light is a prime requisite.

Chairs and tables should be turned upside down so that the lower, not easily accessible parts can be coated first. In enameling it is very important to examine all vertical surfaces for runs or sags within the first five minutes, before the liquid hardens and becomes too tacky to smooth out with a wiped brush. This is particularly important around beading, carvings, and turnings, where the brush may skip the valleys. Flat horizontal surfaces are left until last, with excess fluid eliminated by "cross-hatching"—brushing first with the grain then across it.

Finally, care must be exercised at all times that no coat is applied before the underneath one is completely dry. The rule to remember is: never finish over a glossy surface or attempt to sand one that is not hard dry.

Decorative finishes for painted or enameled surfaces are discussed later in the chapter.

OPAQUE FINISHES

As previously mentioned, the purpose of an opaque finish is to conceal the surfaces of woods deficient in grain patterns, or to hide inferior material, or even poor workmanship. Applied with brush or spray gun, these finishes run the gamut of color and sheen, from a high gloss enamel to flat paint, and may be decorated with decalcomanias, stencils, peasant painting, various novelty effects, or glazing. This so-called "painted furniture" has become justly popular in bedrooms, bathrooms, kitchens, rumpus rooms and nurseries, as well as on the outdoor porch or in the garden.

Enamel Finish. Although a good grade of enamel will effectively resist mild heat, hot water, milk, fruit stains, and alcohol, unless specifically recommended by the manufacturer, it is not intended for outdoor use. Enamels use varnish, lacquer, or a synthetic as a vehicle for their pigments.

Varnish enamels, unlike paint, which must be thoroughly brushed out, are flowed on with the least possible brushwork. Usually used at can consistency, a varnish enamel may be thinned with varnish or turpentine. Enamels can be sprayed, particularly if heated, although with a suction-feed gun on a small compression unit it may be necessary to dilute the mixture as it comes in the can.

Pigmented lacquer (enamel) produces a very hard, durable, water-resistant film, which is quick-drying and therefore likely to be dust-free. Not suitable for brushing it is sprayed on after dilution with lacquer thinner. Since the lacquer, its thinner, and lacquer spray dust are highly inflammable, precautions are necessary to prevent combustion when spraying inside the shop. The installation of an exhaust fan should be seriously considered if extensive spraying operations are contemplated indoors.

Synthetic enamels can be applied by either spray or brush with equal success. Made from a synthetic resin base they deposit a tough, weather-resistant film, which dries in from 4 to 6 hours unless accelerated by baking. Their solvents are supplied or specified by the manufacturer.

Today there are many "quick-drying" and "one-coat" enamels on the market, in a variety of colors and glosses. While it is true that when applied over a wood as hard and as light colored as maple or birch a single coat will hide with a uniform gloss, yet it is not likely that one coat will satisfactorily cover softwoods such as white pine and basswood, porous woods like poplar and spruce, coarse woods with the variegated grainings displayed by yellow pine and fir, or dark redwood or gumwood.

On soft woods, a hardening coat of shellac, diluted 50 per cent with denatured alcohol, can be applied and sanded smooth when dry with 3–0 abrasive. A dark wood, or one with a prominent grain, should receive a priming coat of enamel that has been reduced at the rate of a tablespoon of turpentine to a quarter pint of varnish enamel. When thoroughly dry, this coat is sanded smooth and given a second coat at can consistency.

Undercoater. The best professionally applied enamel finishes consist of at least three coats and a final rubbing. This insures both greater depth and smoothness in the final film. Instead of diluting the enamel for the initial coat, an enamel undercoater is used. This is nothing more than a heavily pigmented, flat-drying hard paint that possesses better hiding qualities than are offered by the glossy enamels. The fact that the undercoater is basically a paint does not mean that a flat wall paint can be successfully substituted for it; raw paint is too soft to stand up to the necessary sanding. If, however, an undercoater is not available when needed, a satisfactory substitute can be mixed from 8 parts of flat white paint to which 1 part of enamel has been added as a hardener.

Although enamel undercoater comes only in white, it can and should be tinted to approximate the shade of enamel to be used. This is easily accomplished by thinning a small amount of color ground in oil with turpentine and stirring it gradually into the white undercoater. Since an exact match is not required, the

final shade should not be markedly darker or lighter than the enamel. The following table indicates the approximate tint that will be produced by an ounce of thinned color added to a gallon of white undercoater, enamel, or paint:

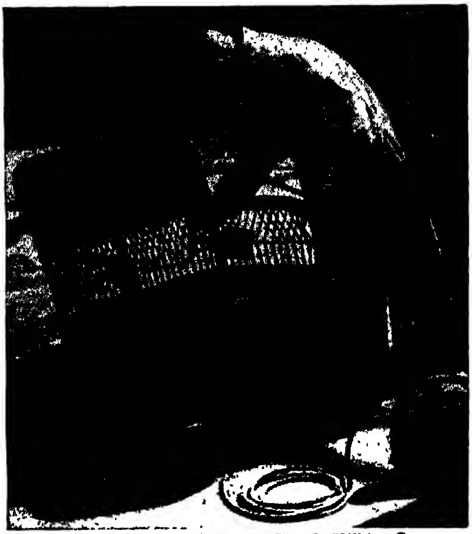
Desired Tint	*Pigment Color*
Cream	Golden ocher
Yellowish	Medium chrome yellow
Warm ivory	Raw sienna
Yellowish ivory	Yellow ocher
Peach	Burnt sienna
Apricot	Orange chrome yellow
Coral rose	American vermillion
Lavender pink	Rose pink
Orchid	Rose lake
Light gray	Raw umber
Warm gray	Burnt umber
Cream gray	Vandyke brown
Dove gray	Drop black
Steel gray	Lamp black
Gray blue	Ultramarine blue
Robin's-egg blue	Prussian blue
Light blue green	Blue green
Light yellowish green	Yellowish green

Enamel Undercoat Schedule.

1. Sand surface with a 2/0 abrasive, clean thoroughly, and seal end grain. Seal knots with aluminum paint.
2. Apply one coat enamel undercoater tinted to approximate shade of final coat.
3. Fill cracks and sand smooth with 3/0 abrasive.
4. Apply intermediate coat of half and half undercoater and enamel.
5. Sand lightly with 3/0 abrasive.
6. Apply finish coat of enamel.
7. For a semigloss luster, rub to hard smoothness with 3-F pumice stone and rubbing oil.
8. For a high polish use rottenstone and water (see section devoted to varnish finish).

Paint Finish. Frequently constructed from cypress, pine or redwood, outdoor furniture must be protected from the elements by a tough, elastic film that will not chalk off under careless handling. These slick or porous woods require a priming coat whose adhesive qualities are sufficiently tenacious to provide a good bond. Modern house-paint primers contain tung oil, which needs no thinning as it comes from the can. Aluminum paint or shellac should be used to close end grain and to cover knots.

Unless a sloppy or dirty coat has been applied, it is not necessary to sand between paint coats. The second coat should be a good grade of exterior home paint, hardened by zinc oxide up to one third of the pigment. A final coat of the exterior paint, without thinning, will complete the job. In no case should paint be applied over an old enamel finish or vice versa; owing to their different expansion rates, the extreme changes in temperature to which outdoor furniture is subjected will result in cracking and crazing of the exterior coat. A final coat of exterior spar varnish will stop the chalking and thoroughly weatherproof the surface.



Courtesy The DeVilbiss Company

FIG. 5.7a. Spraying fiber furniture.

The best method of finishing reed or fiber furniture is by spraying, even if only a hand-pump sprayer is available. Brushing piles up paint in the interstices, wipes thin on wearing surfaces, and fails to reach deep spots.

TRANSPARENT FINISHES

The purpose of all furniture finishes is to provide a protective coating; transparent finishes provide this coating without obscuring the underlying grain of the wood. For woods such as mahogany, walnut, red gum, and the fancy veneers and inlay woods that possess sufficient natural color and a desirable grain pattern, a natural finish employing no stain but providing a desirable sheen is entirely appropriate.

The present vogue for natural finishes is a normal reaction from a period when dark stains were used to conceal substitute woods, or piled up in layers to

simulate rich depth. Nowadays the native grain and figure of choice hardwoods is appreciated and enhanced by more honest methods.

The schedule for any transparent finish must consider the porosity or coarseness of the grain to be covered. Except with mission or weathered oak and Old World finishes, it is common practice to fill all coarse-grained woods so that the pores are flush with the surrounding surface. This builds up a uniform level for succeeding finish coats, free from pockets for dust and dirt deposits. Colored fillers, furthermore, are important aids in emphasizing the grain pattern.

Fillers. Ready-prepared fillers are entirely satisfactory and easy to apply. They are available in stock shades of light and dark walnut, red and brown mahogany, natural, light and dark golden oak, and other wood colors, as well as white for novelty finishes. The addition of drop black ground in oil will produce the deeper shades, and zinc oxide will lighten the color of a prepared filler until it is suitable for almost any job. For the hobbyist who prefers to mix his own filler or has a special job in mind, it is no difficult matter to make up a natural (transparent) base filler from powdered rock quartz, known to the trade as "silex." A mixture of 2 oz. of turpentine, 2 oz. of japan drier, and 5 oz. of boiled linseed oil is slowly stirred into 2 lb. of fine powdered silex. The resulting mixture is thinned as shown in the table below and can be colored with pigments ground in oil. Vandyke brown shaded with drop black, burnt umber, rose pink, or zinc white will provide a variety of colors.

Mixture. Paste (silex) filler is available in half-pint, quart, and gallon cans weighing approximately 1 lb., 5 lb. and 15 lb. respectively. Although it is already mixed with linseed oil and japan drier, the paste must be thinned to the consistency of thick varnish so that it can be brushed on. As a thinner, naphtha decreases the drying time while turpentine tends to hold the coat open; the two can be mixed together to moderate the drying period. Boiled linseed oil will hold the coat open for at least half an hour; japan drier will speed up the drying process. The thickness of the mixture will depend upon the coarseness of the pores to be filled. The filler mixture required for the more common woods is suggested below:

Heavy	*Medium*	*Thin*	*None*
Philippine mahogany	Walnut	Maple	Cedar
Oak	Mahogany	Gumwood	Pine
Ash	Cherry	Birch	Basswood
Chestnut	Rosewood	Beech	Poplar
	Elm	Redwood	Fir
		Alder	Spruce
			Cypress

Obviously, the larger the pores to be filled the thicker the mixture must be, and vice versa. As received, the paste filler must be well spaded with a putty knife and thinned to brushing consistency for the job in hand. Relative measures

for the three types of mixture are indicated in the following table. Properly thinned a quart of filler should cover approximately 70 sq ft.

1 Qt Mixture	*Paste*	*Thinner*
Heavy (16-lb base)	2 lb	1 pt
Medium (12-lb base)	1¾ lb	1 pt 2 oz
Thin (8-lb base)	1⅓ lb	1⅓ pt

Application. Assuming that a dark shade of filler has been selected to highlight the grain figure in walnut, mahogany or oak in order to distinguish it from imitations on gumwood, poplar, beech, and other inferior woods, the first step before the actual filling operation is to apply a wash coat of white shellac diluted 1 part shellac to 6 parts of denatured alcohol. This will prevent the oil in the filler from darkening the wood.

Meanwhile the filler is mixed to a creamy brushing consistency, regardless of whether it is of 16- or 8-lb base. When the wash coat of shellac sealer has completely dried, the filler is liberally applied by means of a short-bristle brush ***with*** the grain. Because of later operations it is wise to limit the brushing-in to a maximum of about 10 sq ft at a time.

Within 15 or 20 minutes the sheen of the filled surface will have flatted sufficiently for wiping. This is accomplished by "towing-off" all surplus filler, wiping *across* the grain with clean burlap rags. If the filler has commenced to harden it can be softened by moistening a rag in the naptha thinner. For cleaning out carvings, beadings, and corners a picking stick whittled from a 6 in. length of ⅜-in. dowel and sharpened to a pencil point at one end and to a sharp wedge at the other is useful under a burlap layer.

After all surplus filler is towed-off, a final wiping with a soft lintless cloth along the grain will insure complete cleansing. The filler must then be allowed its full drying time. Rather than risk sealing a damp sealer it is advisable to increase the minimum drying time by one half; thus the so-called "4 hour" fillers should be permitted 6 hours and those retarded by turpentine and linseed oil allowed a full 36 hours. A light sanding with 3–0 paper followed by a dusting with compressed air from a vacuum cleaner or empty spray gun will insure a smooth surface for sealing.

The hobbyist will encounter so-called "liquid wood fillers" on the market, which are little more than colored sealers for softwoods. Composed of an inferior grade of varnish with a small amount of silex, these liquid fillers are frequently employed in cheap furniture finishing.

Sealers. Prior to applying the filler the wood was protected from discoloration by a sealer consisting of a wash coat of diluted white shellac. Professional finishers of high-grade furniture prefer to seal the filler also, using white shellac for light finishes and orange shellac for the darker browns and reds in the proportion of 1 part shellac to 4 parts of denatured alcohol. A more durable sealer, which has

grown in popularity, is shellac- mixing lacquer. This can be mixed by first reducing the proper shellac with alcohol as previously mentioned (1 to 6 for bare wood or stain sealer and 1 to 4 for filler sealer), then pouring it slowly into an equal or less amount of mixing lacquer. The resulting mixture not only brushes on easier than shellac, but also is moisture-resistant and dries within 2 hours.

In applying a sealer coat of shellac for a natural finish, absolute cleanliness must be preserved. This is important because the shellac is to become a part of the transparent finish that serves as a final protective film. When dry it should be sanded with 5 or 6/0 paper and thoroughly dusted in readiness for its additional shellac coats, or its wax or varnish finish.

Natural Finish. Applied to fine cabinet woods without benefit of stain, a natural finish is the most transparent of furniture coatings. Except for the use of matching or darker colored fillers, or orange shellac on mahogany and dark woods, the natural finish seeks to protect the wood's surface with a minimum of discoloration, bringing out its natural beauty of color and grain while providing an attractive sheen.

Shellac. A wash coat of shellac having been applied to the bare surface of a close-grained wood, or under and over the sealer in wood having open pores, succeeding coats of shellac should be increased in strength until the third or fourth coat is brushed on at almost can consistency. Shellac applied without thinning at all is likely to form bubbles that will require more than the usual light sanding accorded each coat. A 4-lb cut shellac is commonly used, indicating the number of pounds of flake shellac that have been dissolved in a gallon of denatured alcohol. In reality a spirit varnish, water-white shellac is a bleached form of natural orange shellac. When shellac is applied by brush, the bristles should be well loaded and the surface covered as rapidly as possible.

Wax Finish. In order to protect the insufficient wearing qualities of shellac, either a wax or varnish finish will be required. The traditional wax finish is easy to apply and produces a pleasing eggshell gloss, but will not withstand excessive heat or liquids, and requires periodic renewal. There are available prepared paste and liquid turpentine waxes that may be placed between the folds of a clean cheesecloth pad. Applied with a rotary motion to the shellacked surface, the wax is forced out through the folds as the rubbing progresses.

"Self-polishing" waxes contain water instead of turpentine as a vehicle; when the water evaporates the wax is left as a deposit, without polishing. Regardless of the type of wax which is used, it is the number of coats that will determine the depth and final sheen of the finish. No coat should be applied until the preceding coat has thoroughly dried; and each coat (except the first water-wax coat) should be vigorously polished with the grain, before the succeeding coat is applied.

For the home craftsman who prefers to mix his own wax, a formula employing Brazilian carnauba wax, the hardest of the natural waxes, will produce an excellent surfacing medium. To add flexibility an equal portion of ceresin wax is added, with turpentine as the vehicle in the proportion of 1 pt of turpentine to a pound

of each of the waxes. The latter are first shredded and melted in a double boiler, so that the warmed turpentine can be added. If it is desired to color the wax, a small amount of the required color, such as Vandyke brown ground in japan, is mixed with the turpentine before the latter is heated in warm water.

Varnish Finish. Offering depth, hardness and durability, the varnish finish has been and still is one of the most popular of the transparent films. Varnish, however, because of its oil content cannot produce as pale a finish as shellac and tends to darken with age.

The chief drawback in applying a varnish finish is its slow-drying property, which permits it to pick up dust from the air while it is still tacky. This is due to the slow-drying oils, which act as a vehicle or binder for the resins. Varnishes containing a large percentage of oil are known as "long-oil varnishes"; those containing a small portion of oil are called "short-oil varnishes."

The selection of the type of varnish to be used depends upon the kind of finish desired. In general, the short-oil varnishes not only dry more quickly but rub and sand-clean without the gumming encountered with long-oil varnishes. Among the varnishes using a short-oil vehicle the palest are the quick-drying, so-called "Four Hour," and the pale rubbing and polishing types, which are suitable for a natural finish. "Rubbing and polishing" is a general term for a number of short-oil varnishes especially manufactured for furniture finishing. A varnish very short in oil and capable of taking a high polish is known as a "polishing varnish," containing very hard resins.

Floor varnish with a medium-oil base is a hard-drying finish frequently applied to furniture. Another medium-oil varnish more frequently used on interior trim is known as "flat varnish," a labor-saving mixture that dries dull in about 12 hours. Special types such as table top and bar top varnishes dry slowly and retain great elasticity to resist the effects of scratching, water, heat, and in the case of the bar top varnish, mild acids, perfumes, and alcohol in general. Spar varnish is another slow-drying, long-oil mixture that dries with a tough, elastic, and very durable surface. It is most frequently applied to outdoor furniture.

All that has been previously mentioned regarding cleanliness of the work surface and the surrounding air must be emphasized in applying a varnish finish. In order that the surface to be coated can be rendered immaculate, it is customary to pick up all dust particles during the final dusting with a "tack rag." This can be made from an old cotton handkerchief, which is first dampened with warm water and wrung out. It is then sprinkled with turpentine, and a small amount of varnish, then wrung out thoroughly until almost dry. It then has a slight "tackiness," which picks up dust as a magnet attracts filings. The tack rag can be kept indefinitely in a tight Mason jar, after it is sprinkled with a few drops of turpentine.

To insure that the main supply of varnish remains unadulterated and free from dust, it is best to pour a small amount into a metal cup, as the work progresses. A strike wire should be inserted through holes near the cup rim to protect

the bristles when wiping off excess varnish after dipping. When the job is completed, left-over varnish in the cup should be discarded and not poured back into the can, since it is almost certain to contain dirt and dust.

The technique of brushing on varnish is slightly different from that of flowing on enamel. On vertical flat surfaces it is usually cross-brushed, being first applied horizontally against the grain from either side, halfway across, with the brush lifted quickly at the end of each stroke to avoid excessive overlap. After the entire surface has been covered across the grain, the brush is wiped off against the strike wire and the surface lightly brushed along the grain with the tips of the brush bristles. This "tipping" is accomplished with featherlike strokes from the top of the work down to the center, then up from the bottom, the brush being cleaned off against the strike wire after each up and down stroke. In covering flat, horizontal surfaces, the cross-brushing can be eliminated and the strokes commenced from the center of the far side, with the grain, from right to left. The tipping is done in a continuous stroke from one side to the other. Turnings should be brushed round-and-round, then tipped longitudinally.

In spite of extreme care specks of dirt will lodge in the varnish coat. These must be removed as the work progresses, before the varnish becomes so tacky that it will not flow together again. Very often a clean sliver of wood, lightly applied, is sufficient to remove the speck. Professional varnish finishers rely upon a ball of burnt varnish which is rolled between the dampened fingers, then impaled upon a stick. Gently touched to the dust specks, it lifts them out, after which they can be imbedded in the ball of "varnish" by rolling it between fingertips. Burnt varnish is in reality crushed rosin melted in a water bath and thinned with varnish in the ratio of 6 parts of rosin to 1 part varnish. After being well mixed and cooled it will keep indefinitely.

As previously stated, a varnish base finish flows best at a minimum temperature of 70°. Unless applied over a shellac coat, the initial varnish coating should be thinned in the proportion of 1 part of turpentine to 6 parts of varnish. Only enough should be mixed for the job in hand and the coat allowed to dry overnight. Although a second coat will suffice for a surface that has been properly filled and sealed, three and even four coats are commonly applied to fine cabinetwork. As has been repeatedly emphasized, a coat of finish must never be applied before the preceding coat is completely dry. With varnishes of varying drying rates the classic test for hardness is by pressing with the thumbnail; if no impression is left on the varnish it is safe to apply the next coat. Some varnishes require as long as three days to dry.

Varnish, like enamel, will not adhere to a glossy surface. Hence the first coat must be dry-sanded with a 5-0 garnet finishing paper, and thoroughly dusted. For this work new sandpaper should be scuffed by rubbing two sheets together to remove the sharp cutting edges. For turnings, beadings, or panel corners and other difficult contours, 2/0 steel wool will prove a satisfactory substitute.

The second and succeeding coats (exclusive of the final coat) can be success-

fully rubbed down with a 6/o garnet waterproof paper or No. 1 pumice stone and water. After the gloss has been removed, the slush can be washed off with water, cleansed with a chamois skin, and allowed to dry out thoroughly.

Polishing. After the Victorian reign of the high-gloss "piano" finish, the more restrained satin finish has come into its own as the perfect blend for modern decorative effects. It is achieved on the final coat after a rubdown with No. FF pumice and water, by employing rottenstone and oil to the surface when dry.

In applying either pumice or rottenstone to a flat surface of fair size, it is advisable to use a sifter, converted from a discarded soap powder container, so that the entire (horizontal) surface can be sprinkled. The rubbing element is a piece of ½-in. felt, preferably glued to a wood backing for uniformity of surface. The rubbing is done with the grain, and no additional powdered abrasive should be added as the rubbing progresses lest it lump up and cut into the work. For vertical surfaces the pumice or rottenstone must be applied directly to the felt. After being rubbed, the work is cleaned off with water and a soft damp cloth or chamois.

Rottenstone does not cut into the finish but brings up its sheen when lubricated with a special paraffin-base rubbing oil, or a light motor oil thinned with benzine. For a high (piano) finish, water must be substituted for the oil lubricant with rottenstone. When the desired quality of polish has been secured in either the satin or highly polished finish, the surface is slushed off with water and a wet chamois, and when dry is thoroughly cleaned with a soft cloth and naphtha or benzine. For a high polish equal parts of olive oil and denatured alcohol can be rubbed in with a cloth pad. The oil can later be "spirited off" as will be explained under French polishing.

Although varnish has been traditionally brushed on, there is available a type manufactured especially for spraying. Ordinary varnish is usually thinned with turpentine for spraying, with as much as 25 per cent added for suction guns on small compressors.

Natural Finish Varnish Schedule.

1. Sand with 4/o garnet paper and dust.
2. Shellac washcoat (1 part shellac–6 parts alcohol). Dry.
3. Sand with 4/o garnet; dust.
4. Fill and wipe open-grained woods. Dry.
5. Sand with 3/o paper; dust.
6. Shellac washcoat (1–4). Dry. Shellac mixing lacquer preferred. Optional: Varnish (6 parts varnish–1 part turpentine.)
7. Sand with 5/o garnet; dust.
8. Pale Rubbing and Polishing Varnish. Dry.
9. Sand with 6/o waterproof paper (or No. ½ pumice) and water. Slush off and dry.
10. Third coat of same varnish. Dry.

11. Rub with FF pumice and water. Slush and dry.

12. Satin finish: Rub with rottenstone and oil. Slush and dry. Clean with naphtha. Alternate treatment: Rub with 3/0 steel wool. Wax if desired. Piano polish: Same, substituting water for rubbing oil. (A third or fourth coat of polishing varnish will speed the operation). When the surface is dry apply polishing oil. May be waxed instead of polished.

Varnishing Precautions.

Beware of *dust*, both from sanding and in the air.

Never handle, sand or varnish any coating unless "thumbnail" dry.

Always *sand glossy surfaces* to produce a "tooth" for anchoring the next coat.

Use pumice and water to cut into the finish, rottenstone and oil to bring up the polish.

Lacquer Finish. Because of its rapid-drying dust-free characteristic, and its hard, durable surface, the lacquer finish is a favorite where spraying equipment is available; some lacquers are manufactured which are suitable for skillful brushing. As previously stated, however, it presents a distinct fire hazard when spraying indoors. Not suitable for application over a varnish coat, which it "lifts," lacquer can be satisfactorily applied over shellac or shellac mixing lacquer. The fact that each coat of lacquer slightly dissolves the preceding lacquer film insures a perfect bond after a minimum of sanding to provide the necessary "tooth."

When filler paste is used under lacquer, it should be cut with naphtha rather than turpentine, and care should be exercised that the pores are thoroughly packed to insure a level surface for the thin-bodied lacquer. It is good practice to pad the filler with a handful of burlap, instead of relying upon the towing-off process alone to caulk the pores tightly. The sealer may be shellac, shellac mixing lacquer, straight lacquer, or a special lacquer sanding sealer usually containing silex, which builds a level surface in one application equal to two ordinary lacquer coats.

For the satin finish, a clear gloss lacquer is sprayed on and rubbed down as for a varnish finish; a better grade rubbing and polishing lacquer is available for this purpose. Flat lacquers produce a satin luster, without rubbing, which is more durable than the eggshell finish of the short-oil flat varnishes. Gloss and flat lacquer can be mixed in various proportions to produce any degree of sheen. Rubbing and polishing schedules are the same as for varnish.

As previously mentioned, lacquer is thinned only with lacquer thinner. The spraying consistency should be checked by test patterns on wrapping paper and the liquid strained into the gun to prevent clogging by undetected dirt.

The lacquer-finishing schedule is the same as for varnish, substituting three sprayed coats of lacquer for the three brushed (or sprayed) varnish coats without intermediate sanding, except in the case of dust or dirt deposits.

Oil Finish. Less frequently employed in these days of improved, fast-drying furniture finishes is the linseed oil finish. Applied directly to the bare wood, an oil finish is rubbed into the wood rather than on it, producing a soft, lustrous sheen like that of a gunstock, almost impervious to scratches. Like the original

French polish, however, it is a hand-rubbed polish, which requires a series of applications over a considerable period of time.

Assuming that the surface of the work has been thoroughly sanded and dusted, it is then moistened with a wet sponge or pad and dried quickly by playing the flame of a blowtorch over it. The raised grain is then sanded down lightly with a fine abrasive, dusted, and the process repeated until the grain or fuzz ceases to rise. In lieu of a blowtorch an electric laundry iron over a damp cloth can be used. When dry and thoroughly clean the surface is ready for its first oil coat.

A pint of raw linseed oil should be sufficient for the average job. After it is thinned with 3 parts of turpentine, it can be brushed onto all surfaces and allowed to stand half an hour before the surplus is wiped off; it is then allowed to stand overnight. Meanwhile a pint of pure boiled linseed oil is left open but protected from dust to oxidize into as thick a "syrup" as possible.

Next all end grains should be filled and sealed with a suitable shade of paste filler that has been thinned with equal parts of spar varnish and turpentine. After being towed-off and wiped, it is allowed to dry out another 12 hours.

Once the filler is dry, a coat of the thickened boiled linseed oil can best be applied with the bare hands, working in small circles away from the body. A minimum of two additional coats, well rubbed in at 24-hr intervals, should be applied, more if time and patience permit. Oil finish is ideal because it fills the pores with oil; therefore it is not necessary to resort to a paste filler (thinned with boiled oil and turpentine).

After the last coat has dried for 24 hours or more a final coat consisting of equal parts of boiled linseed oil and drier is applied. When it has become quite tacky, it is towed-off with burlap across the grain and allowed to dry for another 24 hours.

The rubbing is accomplished with rottenstone and a buffing block for the flat surfaces, or a buffing stick for rounded surfaces such as legs, spindles or spreaders. Buffing blocks can be suitably shaped from wood and faced with saddler's leather. The leather surface is charged by rubbing the rottenstone over it several times; then the work is rubbed with light strokes at an angle to the grain. The leather rubbing surface should be recharged frequently and when it becomes slick with oil, should be scraped off with a case knife.

The more rubbing administered to an oil finish the more the beauty of the grain will be developed. A few drops of the syrupy linseed oil rubbed in with the bare hand over one or more of the surfaces once a month will add to the luster. A simple polish that can be applied to an oil or varnished surface can be made by dissolving 1 oz. of carnauba wax in 2 oz. of turpentine heated in a water bath or double boiler. When thoroughly melted, 1 pt. of heavy boiled linseed oil and 1½ oz. of japan drier are added and allowed to simmer for about 10 minutes. The mixture should then be stirred until cool and stored in a Mason jar.

French Polishing. Prior to the period of Georgian cabinetmakers the wax finish was used for oak, walnut, and mahogany. With a freer employment of

inlay and veneer between 1750 and 1800, the thin, lustrous transparent coating known as French polish became popularized. Still a favorite of conoisseurs of fine furniture finishes, French polish brings out the fine beauty of a wood at the expense of considerable labor and skill. In essence a series of painstakingly rubbed-in coatings of thin shellac, like the oil finish, its success is dependent upon the number of coats that are manually applied.

After a wash coat of shellac, succeeding thin coats of polish are applied with a pear-shaped pad of cotton wrapped in lintless cloth, such as an old linen handkerchief, (Figure 5.8). The pad is dipped into a saucer of full-strength refined

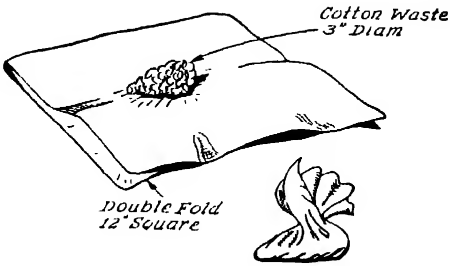


FIG. 5.8. French polishing pad.

shellac (white or orange), covered by its wrapping, and pressed down with a circular rubbing motion with sufficient force to squeeze the shellac out in an even distribution over the lintless wrapper. To avoid excess tackiness the pad is lightly touched to the surface of a saucer of raw linseed oil, from time to time. This should be used sparingly, however, because all the oil must be rubbed out again.

As with the oil finish previously described, the circular rubbing action should extend from a small area across the whole surface. The work is then allowed to dry for 24 hours in a dust-free room and the operation repeated four or five times, with each succeeding coat thinner than its predecessor.

For a high polish, the final coat is "spirited off" by wrapping a piece of lint-free cloth around the fingers, slightly moistening it with alcohol, and lightly rubbing it over the surface to smooth out any microscopic ridges and to bring up the gloss. This is a delicate operation because the alcohol will burn off the shellac finish if allowed to rest upon it for more than a moment. The final polish is obtained by vigorous rubbing with an old silk handkerchief. For a dull polish the spiriting off is omitted and a rubbing with felt dipped in oil and pumice stone substituted.

Synthetic Finishes. With the increasing perfection of man-made synthetic resins, nearly all varnishes and lacquers have their synthetic counterparts. Most of the "four-hour" varnishes and enamels are manufactured from a synthetic base that confers a tough, durable, weather-resistant film. In general, however, they do

not rub down as well as varnish or lacquer although equal to the former in solid content and depositing a thicker coating than lacquer.

Courtesy The DeVilbiss Company

FIG. 5.9. Spraying a synthetic resin on plastic covered cushions.

Synthetics can be applied by brush or spray, in the latter case thinned for suction feed. Only the thinner recommended by the manufacturer should be used, since a thinner for one brand may not prove to be the solvent of another.

STAINING

If the craftsman has been unable to obtain enough wood for his project with a color or grain of sufficient uniformity to insure an effective natural finish, he must resort to staining. This is particularly true in the case of mineral streaks in maple, for example, sap streaks in walnut, or gumwood with uneven coloring. Stain is also used to soften and blend the obtrusive markings of inferior woods

such as fir, spruce, and yellow pine. And finally, stains may be employed on close-pored, cheaper woods to imitate the preferred cabinet woods, or in novelty finishes. This means that beech, birch, pine, and poplar can be stained to resemble maple; birch, gumwood, spruce, and poplar to simulate walnut; and birch and gumwood in imitation of mahogany.

All staining operations should be preceded by tests on a scrap of the wood In this way mistakes can be rectified without the necessity of sanding out, and the shade can be darkened or lightened prior to final application. If identical scraps are not available, the undersurfaces or concealed portions of the work can be utilized for trial applications.

Aniline powder stains are often classified according to the solvents they contain. Thus we have water, oil, spirit, and lacquer (thinner) stains. In addition there are the pigment (wiping) stains used for shading and unifying, the specially mixed shading stains employing aniline powder with a binder, and the non-grain-raising stains.

Since no stain can color, penetrate, and protect in one coat, a sealer is required such as a wash coat of shellac, shellac mixing lacquer, thinned varnish, or lacquer to prevent the stain from being wiped off when handled, or from bleeding through the finish coat. As will be noted in the finishing schedule on page 330, the best practice includes a sealer over the stain whether or not a filler with its accompanying sealer is to be employed. As previously explained, a sealer under the filler insures that the color in the latter will be contained in the pores instead of diffusing throughout the grain.

The aniline powder stains are mixed on the basis of 1 oz. of powder to 1 qt. of solvent for a strong solution. All stains may be applied by spray, which in most cases is the ideal method. In addition, the penetration of the stain will be increased if it is applied warm.

Water Stains. Water stains are cheap, penetrating, nonfading and brilliant. Their one drawback is that the water solvent raises the grain of the wood. To counteract this the usual procedure is first to sponge the wood lightly with warm water and, when it has dried to sand the raised grain smooth with 3/0 paper. Inasmuch as some of the pliant wood fuzz may be pressed down rather than cut off by this early sanding, many finishers prefer to apply the water stain first and when the raised grain has dried out, spray it with a mist coat of shellac to give it a stiffness for the sanding.

Water stain can be best applied with a spray gun unless the amateur finisher has acquired sufficient skill in its rapid application with a wide brush to avoid lap marks from uneven brushing. A final stroking with an empty brush along the grain will do much to unify a brushed-on stain. End grain, unless protected with a thin coat of glue size, should either be wiped off immediately or sponged with water just before staining, in order to prevent excess darkening.

The following table of approximate colors can be made up into stock solutions in gallon bottles or quart jars, according to the frequency of anticipated use. In

APPROXIMATE WATER STAIN FORMULAS (1 GAL)

Stain	*Yellow* (*oz.*)	*Orange* (*oz.*)	*Red* (*oz.*)	*Dark Blue* (*oz.*)	*Black* (*oz.*)
Light red (Sheraton) mahogany	—	3	1¼	¾	—
Medium red mahogany	½	1½	1½	—	¾
Red mahogany	—	2¼	1¾	1	—
Dark red (Colonial) mahogany	½	1½	1¾	—	1
Brown mahogany	1	4½	—	1	—
Light walnut	—	3	¼	—	1
Medium walnut	—	3½	¼	—	1½
Dark (American) walnut	—	3¾	¼	—	1¾
Light oak	¼	2½	—	½	—
Dark oak	½	2½	—	¾	—
Golden oak	—	5½	¼	¾	—
Honey maple	1	2¾	—	½	—

mixing the stock colors the water should be hot but not boiling, and the dark colors added last. Various shades may be obtained by mixing measured samples of stock solutions; lighter shades of the same stock are obtained by adding water.

Lacquer Finishing Schedule (Water Stain).

1. Sand with 4/0 garnet paper and dust.
2. Stain with water stain. Dry.
3. Spray shellac mist coat. Dry.
4. Sand raised grain with 4/0 garnet and dust.
5. Fill and wipe open-grained woods. Dry.
6. Sand with 3/0 garnet and dust.
7. Spray clear gloss lacquer. Dry.
8. Sand lightly with 5/0 garnet and dust.
9. Second coat clear gloss lacquer. Dry.
10. Sand lightly with 5/0 garnet and dust.
11. Third coat clear gloss lacquer. Dry.
12. Rub to satin finish. (See operation 12 of Natural Finish Varnish Schedule).

Non-grain-raising (NGR) stains although more expensive than water stains, are favored by many finishers because of their fast-drying, nonbleeding penetration. This fast-drying characteristic of the glycol solvent that has been substituted for water makes NGR stains difficult to brush on; furthermore, the very wetness of a brushed coat tends to raise the grain slightly.

In home mixing, 1 qt of warm diethylene glycol (Carbitol) or ethylene glycol

(Cellosolve or Prestone) can be mixed with 1 oz of aniline powder soluble in alcohol. Neither is a solvent for walnut crystals or nigrosine (black). In place of the latter, a deep blue-violet will prove satisfactory. To determine solubility, it is a good practice to wet a pinch of the powdered dye that has been placed on a blotter or piece of newspaper with a few drops of the warm solvent to make a ring. If the stain spreads to about two thirds of the wet circle the solvent may be considered satisfactory.

Penetrating oil stains employ aniline powders soluble in naphtha, benzol, turpentine and even low-test gasoline. Easy to apply with a brush, penetrating oil stains are non-grain-raising but will penetrate more deeply into the soft parts of the wood. They will bleed through filler coats, varnish, and lacquer and hence *must* be sealed, preferably with a wash coat of shellac. End grain should be wiped immediately to prevent the stain from striking in too quickly; excess stain should be wiped from other surfaces to produce an even color. The sooner the surface is wiped the less penetration there will be and the lighter the stain.

Spirit stains, composed of aniline powder, which is soluble in alcohol, will strike through almost any finishing coat and dry so rapidly that they are not suitable for brushing, unless a small amount of shellac is added to give body. Although spirit stains are subject to early fading, their ability to penetrate an old varnish finish renders them acceptable for refinishing and touch-up work. Being alcohol soluble, the wash coat of shellac must be very lightly applied or it will lift and muddy the spirit stain.

Shading stains are alcohol-soluble powders mixed with thin shellac, or lacquer thinner soluble powders mixed with lacquer. The added body conferred by the binder permits these stains to be used between finishing coats for shaded effects, or to conceal sap and mineral streaks.

Pigment oil stains, consisting of colors ground in oil, mixed with linseed oil, turpentine or naphtha, from what is in reality a very thin paint, which tends to obscure the grain The colors are nonfading and nonbleeding and are habitually applied by brush. After being allowed to stand for about five minutes the surplus is lightly wiped off with a clean cloth. The shade can be controlled by the timing and pressure of the wiping. If wiped too soon or with too much pressure the resulting shade will be light; if less pressure is exerted or the wiping delayed, a darker shade will result. Delayed wiping. however, is apt to encounter a tacky, gummy surface, which must be overcome by moistening the cloth with turpentine. When applied to pine, fir, spruce, basswood, poplar, and redwood, a wash coat of shellac will prevent the stain from penetrating too deeply, and makes the wiping easier.

Wiping stains are concentrated pigment oil stains that are used for shading or antiquing. As their name implies they are wiped off to expose highlights, as explained later in the chapter. They are also used in their concentrated form on softwoods such as white pine, poplar, and basswood, but should be reduced with naphtha for harder woods like maple, beech, birch, or gumwood.

Varnish stains consist of a combination of pigment or aniline stain and varnish for an inferior one-coat job. Since such a stain lacks penetration it should never be applied to bare wood.

Short Cuts. The finishing processes and schedules discussed thus far in the chapter have been based on the assumption that the painstaking craftsman has ample time at his disposal to produce a perfect finish. For the amateur finisher who has become adept in the use of the spray gun, and upon whom the time element may make frequent demands, several short cuts can be selected from the preceding pages, which, when carefully applied will produce an entirely satisfactory finish. For example, NGR fast-drying stains while more expensive than water stains are great time savers both in the matter of drying time and in eliminating the necessity for sanding off the raised grain fuzz. Again, quck-drying paste fillers are entirely satisfactory provided they are permitted to dry thoroughly, and, in the case of stained wood, can be applied without a preliminary sealer since their diffusion will be less noticeable. As already mentioned, a sanding sealer, properly applied, can equal two coats of lacquer in depth, and lacquer itself provides a

CHARACTERISTICS OF WOOD STAINS

	Water stain	*Non-grain-raising stain*	*Penetrating oil stain*	*Spirit stain*	*Pigment (wiping) oil stain*	*Shading stain*
Use	Hardwoods	Hardwoods Refinishing	Softwoods	Patching	Softwoods Shading	Softwoods Hardwoods
Coloring medium	Aniline powder	Aniline powder	Aniline powder	Aniline powder	Pigment in oil	Aniline powder
Solvent	Water	Diethylene glycol Ethylene glycol	Turpentine Naphtha Benzol	Denatured alcohol	Turpentine Naphtha Benzol	Alcohol Lacquer thinner
Application	Brush or spray	Spray (best)	Brush and wipe	Spray (only)	Brush and wipe	Spray
Grain raising	Bad	Slight (brushed)	None	When humid	None	None
Bleeding	None	Slight	Bad	Bad	None	None
Fading	None	None	Some	Bad	None	Slight
Scaler coat	Any choice	Shellac wash	Shellac wash	Shellac wash (sprayed)	Shellac wash Lacquer	Shellac wash (sprayed)

fast-drying coating, which, if selected in the gloss type for a high polished final finish, or a flat type for the satin finish, will save considerable rubbing. Furthermore, lacquer when sprayed on in a mist coat will eliminate the need for a shellac sealer while contributing body to following lacquer coats. Full lacquer schedule follows:

Fast Spraying Lacquer Schedule (with filler).

1. Spray NGR stain. Dry 1 hr.
2. Fill and wipe with fast drying paste filler. Dry 4 hr.
3. Spray sanding sealer. Dry 1 hr.
4. Sand with 5/0 garnet and dust.
5. Spray coat of clear gloss lacquer. Dry 2 hr.
6. Spray coat of flat lacquer.

BLEACHING

A popular finish for furniture of modern design, bleaching retains the attractive grain patterns against an extremely pale background While some pale woods such as maple and birch can be selected without streaks and given a blond finish by means of a pigment oil stain, darker woods such as mahogany or walnut require a thorough bleaching as the basis for Harvest Wheat (Swedish Modern), Heather and Tweed Mahogany, or Ambered, and Old World Walnut effects.

For bleaching the lighter woods a saturated solution of oxalic acid in hot water will prove fairly effective. An efficient alkalizer for removing all traces of the acid in the pores consists of 1 oz. of borax dissolved in 1 qt. of water. Photographer's hypo can be substituted for the oxalic acid if desired. Neither of these acids, however, will satisfactorily bleach a dark walnut or deep red mahogany.

A deeper bleaching job can be realized with commercial bleaches. These usually consist of two powerful bleaching solutions applied separately or premixed as directed by the manufacturer. Although it is possible to spray a bleaching solution, it is better to apply it with a fiber brush or sponge. Rubber gloves are a "must," even with oxalic acid, and if a rubber apron is not available, care should be exercised to prevent splashing. While not all commercial bleaches need be washed off with water, they must be allowed to dry out thoroughly so that the bleaching action will not break through succeeding coats. Like water stain, they will raise a fuzz which must be sanded smooth unless the wood was previously sponged and sanded.

Once bleached, the finishing schedule follows the usual procedure. Listed below are some of the presently popular "blond" finishes, applied after bleaching:

Harvest Wheat Mahogany. Seal and fill with transparent (natural) paste filler lightly tinted with raw sienna ground in oil. Seal and finish with clear lacquer.

Heather Mahogany. Seal and fill with white paste filler. Seal and finish with water-white lacquer.

Tweed Mahogany. Seal and fill with a red paste filler. Seal and finish with water-white lacquer.

Ambered Walnut. Bleach lighter than required. Stain light amber and seal. Fill with natural paste filler, seal and finish with clear lacquer.

Old World Walnut. Seal and fill with paste filler tinted lightly with burnt umber. Seal and shade with a brown wiping stain. Finish with clear lacquer.

Limed Oak. Seal and fill with white paste filler (or white paint minus its vehicle). Seal and finish with water-white lacquer.

Pickled Pine. Stain gray and seal. Apply a white glaze and finish with water-white lacquer; a dark wax finish is optional.

Blond Finish. To obtain a "platinum" finish without recourse to bleaching, clear maple or birch is given a wash coat of light ivory undercoater thinned with 3 parts of turpentine. When dry this is sanded smooth and finished with water-white shellac and white wax. If a lacquer schedule is preferred, an ivory lacquer sealer is used, followed by clear flat or gloss rubbing lacquer, rubbed to a satin finish.

For other possibilities see finishes for pine and cypress paneling in Chapter 11.

DECORATIVE EFFECTS

In silent protest against the newness of modernity, many craftsmen have surrendered to a nostalgia for traditional, aged effects by applying "antiquing" mediums to their furniture finishes. Others have satisfied the urge to disguise the utilitarian characteristics of household furniture by more colorful effects, culminating in the exuberant decorations known as "peasant painting." Between these dark and light extremes are the many interesting expressions of individualistic treatments. Generally speaking, with the exception of certain of the artificial aging schedules, the opaque finish offers the most satisfactory background for the majority of decorative effects. The various methods will be outlined briefly; selection of the most suitable type involves practice, or at least test sampling prior to final study and planning.

Glazing. The general term "glazing" refers to the basic shading operation of applying and wiping off a thin wash or smudge of light pigment stain, in order to soften the color or decorative effect of the finish. When it has been decided in advance that the finish is to be glazed or antiqued, the tone of the transparent finish, or the last coat of an opaque finish is left somewhat lighter and brighter than the desired final shade.

The glaze itself consists of a translucent film of boiled linseed oil thinned with an equal amount of turpentine and japan drier, lightly tinted with Vandyke brown or a sienna, umber, ochre or drop black pigment ground in oil. Applied

freely with a brush or folded cloth swab, the excess fluid can be drawn off with an old brush.

The wiping and texturing process is accomplished with wadded pads of cheesecloth commencing in the center of the work. The liquid is worked out from the corners back into the cleaned-out middle or "highlight" to blend the shading. The procedure is a gentle wiping operation, not a scrubbing, intended to leave a thin glaze of the shade and texture desired. Final distribution can be best accomplished by rubbing with the palm and fingers in a rotary motion, removing excess fluid from the hand as soon as it starts to smudge.

When the glaze is thoroughly dry it should be protected with a coat of white shellac or water-white lacquer rubbed to a satin finish. Ordinary lacquer will yellow the glazed effect and orange shellac will deepen it considerably.

Antiquing is merely another term for glazing, and is descriptive of the intent, rather than the procedure of the operation. Whereas a shading glaze is frequently applied to opaque finishes including peasant painted effects, antiquing more commonly refers to a deliberate aging effect applied over a transparent, stained finish.

The so-called "Old World finishes" depend to a great extent upon the antique aged effect conferred by a selected pigment wiping stain, which is partially removed by the same process, as was described for glazing. For mahogany, walnut, and oak, about 2 oz. of Vandyke brown to a half pint of boiled linseed oil thinned with 50 per cent turpentine will prove a satisfactory antique glazing mixture on mahogany or walnut reproductions of Georgian, Colonial, French Provincial or Swedish Provincial finishes. For a reddish honeytone maple, a half and half mixture of raw sienna and burnt umber should be substituted for the Vandyke brown, while for the brownish Pilgrim Maple burnt umber is used.

Antique maple has come to refer to an Early American style of finish on an orange-red background. The latter stain can be sealed with an orange shellac, then mellowed and aged with a warm wiping stain, highlighted in the worn areas.

A dusty antique finish features the addition of powdered rottenstone to the antiquing mixture in the proportion of 1½ oz of rottenstone to an equal amount of Vandyke brown in a quart of linseed oil and turpentine. This type of finish is usually applied to open-pored woods such as oak, walnut, chestnut, or ash, which have been first "weathered" with a dark brown walnut or oak stain. A water stain containing ¼ oz of mahogany brown darkened by ½ oz of nigrosine to a gallon of water will prove satisfactory. After being sealed, the pores can be left open or filled with dusty gray filler made of white filler paste darkened with raw umber. The filler, if used, is only partially removed by diagonal strokes, and the glaze or slush is also wiped off roughly, so that the corners and crevices remain dark. If wax is used as a final finish it should be darkened with brown or black pigments, and may also contain 1 oz. of powdered rottenstone to the pint for accentuating the dusty effect.

Highlighting is the term usually applied to the operation of wiping the glaze or antique smudge to simulate the wear of long usage. In practice, a wiping stain

of a fairly deep shade is applied in the usual manner and wiped immediately in the light areas that are to be "highlighted." This operation requires skill and practice, for the wiping cloth should be lifted at the end of its stroke in order to feather or blend the light area into the surrounding shadows of unwiped stain. The rule of natural wear should be followed and those areas wiped that would normally receive the most handling or contact, such as the edges of a table top or drawers, panel centers, and the raised parts of turnings, beadings, and carvings, as indicated in Figure 5.10. A study of old museum pieces or authentic antiques

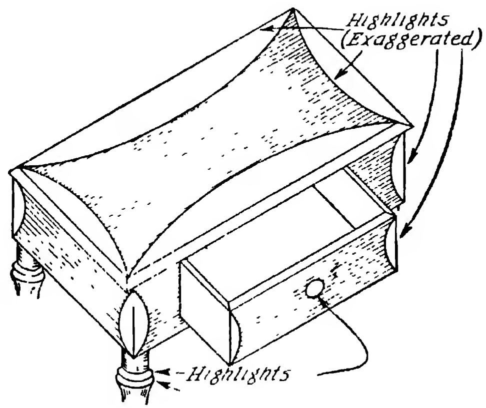


Fig. 5.10. Diagrammatic representation of highlighting.

and reproductions will aid the beginner. If the first efforts are unsatisfactory, the wiping stain can be entirely cleaned off with a cloth dampened in naphtha or benzine, and a fresh start made. Extra clean highlights can be obtained in the same manner.

Shading is another term for the basic glazing process. This process is often applied over the final coat of opaque varnish or lacquer enamel to tone down its bright color and afford relief from plainness. The glaze is mixed and applied in the usual manner after a harmonizing shade has been selected. The Honeytone Maple shade looks well when highlighted over ivory, while Pilgrim Maple blends well with a green surface, and the Vandyke brown of the Old World mahogany or walnut glaze will warm up a gray enamel.

The shading operation can be speeded up by skillful application with a spray gun adjusted to throw a fine *round* spray. In spraying, the diluted stain is misted on, with the gun held at about twice the normal distance. By decreasing the distance the darker areas can be blended in, or wiping can be combined with spraying to further speed up the job.

The shading operation can also be used for uniforming different woods that

have been used in the same piece of furniture. After a light NGR stain is sprayed over the entire piece, a warm wiping stain is applied to the lighter sections and wiped with varying degrees of lightness until a matching tone is obtained. The same effect could be secured by skillful spraying. In either case a shading lacquer between coats is recommended for final toning.

Bone White is the name of a typical shaded enamel finish. It can be purchased as a ready-mixed color or made up by adding a little brown or a touch of black to white varnish or lacquer enamel. After a single coat of the bone white has dried, a wash glaze of raw umber is brushed or sprayed on and wiped off in highlights, which can be blended out with the grain by means of a badger hair blending brush. When the shading stain is dry, a protective coat of shellac, varnish, or lacquer should be applied.

Fruitwood is identical to bone white in application except that the undercoater is tinted orange tan and the glaze is made up of equal parts of burnt umber and burnt sienna. The finish coat should be a dead flat varnish or lacquer.

Two-Toning. A final finish that employs two colors of harmonizing or contrasting enamel is said to be two-toned. A similar effect may be obtained in a transparent finish by the use of light and dark stains. Customarily a natural division separates the colors, such as the framing of a panel, the back, legs, or stretchers of a chair, or the top of a table. The division may be artificial in that it is routed or veined, in which case it must be sealed, and may be separately colored or stained.

Decorator's masking tape, or ordinary Scotch tape is an ideal time saver for establishing the line of demarkation between colors. Pressed down carefully so that its straight "working" edge is not crimped, the second tone or color can be brushed or sprayed on without fear of smudging or blending. Prior planning will indicate which part of the undercoater should be tinted to the color of its particular finish, rather than attempting to divide the two tones over an undercoater of a single color.

Banding is a simplified form of two-toned effect usually applied to an opaque finish at such points as table, shelf and chair seat edges, and between masking tape around chair and table legs, spindles, and spreaders. Two coats should be applied if the final finish is to be rubbed.

Striping is also generally applied over an enamel finish to add interest to an otherwise plain surface. Here, too, masking tape will enable the amateur to turn out lines as straight and clean as are achieved by mechanical stripers. The colors used should be of a thick creamy consistency; colors ground in japan fortified by a small amount of varnish will prove most satisfactory if no protective finish is to be applied.

Color Harmony. A study of the color wheel in Figure 5.11 will solve most mixing problems. Any one of the three primary colors shown in the large circles when mixed with another primary color will produce the secondary color whose initial appears in the medium-sized circle between the primary color used. Thus

yellow and blue make green, blue and red will produce violet, and red and yellow form orange. In like manner the six intermediate colors represented by the smallest circles are the product of the primary and secondary colors adjacent to them. The addition of black produces a *shade;* admixture with white makes a *tint.*

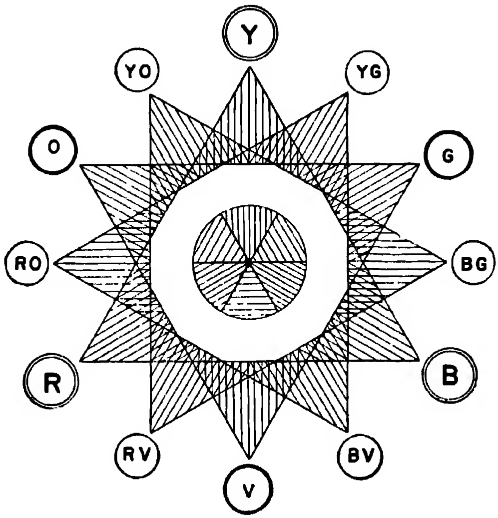


FIG. 5.11. Color wheel.

As will be further developed in Chapter 10, color harmonies consist of combinations that do not clash. They are roughly divided into (1) the *complementary* colors, which are opposite to each other on the color wheel, such as red and green; (2) those which are *analogous* or adjacent to each other, as for example, red-violet, red and red-orange, all related because each contains red; (3) a one-color harmony called *monochromatic* because it is made by changing the value of a single color through the addition of black or white.

Suggested Color Combinations. Referring to the color wheel it will be noted that there are a minimum of five colors which will harmonize with a selected color. For yellow, for example, there is the complementary color violet, which has its two analogous colors, red-violet and blue-violet, plus the analogous colors of yellow itself, yellow-orange, and yellow-green. Analogous colors of analogous colors increase the harmonic band, augmented by pure black, white, gold, and silver. There follow some suggested combinations for two-toning, banding, and striping.

Body Color	*Secondary Color*
White	Red, green, blue, blue-green, cream, brown, gold, or black
Cream	Dark red, medium blue, blue-green, orchid, brown, or gold
Ivory	Chinese red, orange, orchid, light and dark green

Body Color	*Secondary Color*
Yellow	Black, dark green, dark blue, blue-green, brown, peach, brown, gray, or black
Peach	Cream, orange, light green, light blue, blue-green, light gray, or black
Light (lettuce) green	Blue-green, cream, peach, orchid, silver, yellow, or black
Yellowish (lawn) green	Blue-green, cream, orange, or black
Blue green	Ivory, orchid, silver, gray, or black
Light (powder) blue	Peach, yellow, ivory, medium and dark blue, light green, orchid, silver, gray, or black
Orchid	Light blue, ivory, silver, or blue-green
Chinese red	Black, dark blue, ivory, gray, or gold
Red	Black, light green, ivory, silver, or black
Brown	Cream, yellow, orange, gold, or white
French gray	Deep red, black, silver, delft blue
Black	Chinese red, deep red, chinese yellow, light green, light blue, gold, silver, or white

Decalcomania. In addition to striping and banding, enameled furniture can be further decorated with colorful decalcomania transfers, which are available in a variety of designs and colors. Fruit and flower designs, vocational accessories, vegetables, small scenes, and human figures are appropriate for flat or curved surfaces, such as panel centers, drawer fronts, chair backs, table aprons, and bookcase ends. Modern transfers have been so perfected that they are capable of reproducing multicolored designs in the minutest detail; indeed, so-called "plastic veneer" is in reality a photographic decalcomania transfer on a lacquer film, which reproduces the veinings in marble or the graining in fine cabinet woods with amazing fidelity.

The early water type of transfer is still popular, owing to the ease of its application. After it has soaked in a pan of water for a few minutes it is applied to its selected position, where the paper is slid out from under the design. The overlapping of the protective coating of this type of transfer is minimized when it is applied to an enameled surface, but fairly obvious on a stained surface.

A duplex transfer, however, when properly applied, is very difficult to detect from expert freehand painting Consisting of two sheets of paper, it is laid face up on a smooth surface and the colored side brushed with the manufacturer's special cement or with varnish. As soon as the cement or varnish has become tacky, a corner of the heavy paper is separated from the lighter paper, and the transfer applied to the selected spot. A rubber roller or skweegie is used to smooth the back of the design, without wrinkling, after which operations the transfer is allowed to "set" for about 15 minutes. It is then dampened with a sponge until the heavy backing paper can be peeled off from the corner which was previously separated. The remaining layer of thin paper can then be soaked with water and

gently peeled away and the gummy residue washed off with a damp cloth. When dry, any surplus cement or varnish can be wiped off with a cloth moistened with naphtha. No protective finish is required over transfers that have been applied over a final enamel coat; on stained finishes they are usually applied under the final varnish coat.

Stencils. Like decalcomanias, stencils can be procured in a variety of designs and sizes, or they may be cut out by the hobbyist according to an original design. In the latter case the pattern is first traced on regular stencil or other tough glazed paper, then cut out with a sharp-pointed stencil knife. If solid portions of the stencil are completely surrounded by cut out portions, such as the center of the letter "O," for example, tie-ins of paper must be left uncut to support the solid "island." These blank tie marks can be painted in by hand after the painted design has dried. Even when regular stencil paper is available, it should be toughened and waterproofed with a coat of shellac or lacquer after the stencil is cut.

The completed open stencil may be fastened in place with masking or Scotch tape. As was the case with the masking lines used for striping, the edges of the stencil pattern must adhere tightly to the furniture to prevent runs. Thus in the case of a curved surface such as a chair back, great care must be exercised to insure close contact; this is especially true if the pattern is to be sprayed on (with a nozzle adjustable to a round pattern, and reduced air pressure).

Application of the stencil colors by brush will permit careful adjustment as the work progresses. As in striping, pigments ground in oil are reduced to a fairly thick consistency to prevent their running under the edges of the stencil. A regular stencil brush is required because the stenciling operation is based upon a vertical up and down pouncing movement against the bristle ends, instead of the customary lateral brushing. In an emergency the bristles of an old shaving brush can be cut off short to form an effective stencil brush.

Multicolored stencil designs can be produced by cutting separate stencils for each color. This is a tedious method, however, since it is usually necessary to wait for each color to dry before applying another. Faster results are obtained by masking out all but one color at a time. This can be accomplished with standard masking tape, or, if the design permits, by attaching hinged flaps to the stencil. In either case the stencil must be securely fastened in place to prevent slipping during this extra handling.

No protective coat is required over stenciled patterns which are not expected to receive much wear. The stencils can be cleaned for reuse with turpentine or naphtha; lacquer thinner must be used if a lacquer pattern was sprayed on.

Placement of Decorations. When relatively small designs are to be located on large surfaces such as the panels of a cupboard or cabinet, the amateur all too frequently yields to the urge to place his decorative pattern in the exact geometrical center of the available space. Although this location conforms with the natural law of symmetry, it disturbs the illusion known as the "optical center," automatically perplexing the eyes in their restless scanning. This is because of a

fact recognized by expert marksmen that when the eye focuses upon the dead center or bull's-eye of a rectangular or oblong surface, it tends to be pulled downward. Therefore, to offset this "gravitational drag," the true center is raised somewhat, becoming an optical center which is more satisfactory to the critical eyes of the beholder. That is why framed pictures exhibit more mat space at the bottom, and the bottom rail of a door is wider than the others.

The six directions. For developing a composition in a larger area, it can be divided by two diagonal lines and four reciprocals into six directions which are in mathematical relationship to one another, as indicated in Figure 5.12. By locating all decorations in the optical centers, this diagrammatic representation may be utilized as the foundation for a satisfying design, provided interest is sustained by the skillful use of variety and size.

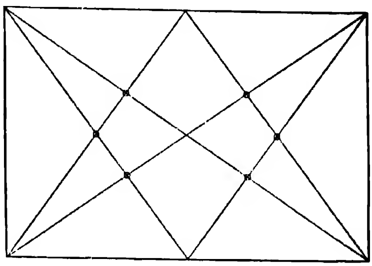


FIG. 5 12. The six directions.

Peasant Painting. During the long winter days and nights or in slack periods between harvests or fishing trips, the "little people" of every country developed their primitive folk arts. Uninhibited by formal artistic training, these peasant designers evolved unsophisticated decorative effects employing a minimum of bright colors. Invariably, however, they succeeded in expressing themselves in those terms with which they were most familiar, and therefore obviously enjoyed. Nature provided the popular flower, fruit and vegetable motifs, augmented by birds, barnyard and forest fauna under the stars in the sky; fishermen, hunters, and trenchermen artlessly interspersed their designs with favorite avocational symbols; the gay harvest festivals of the north and the religious fiestas of the south left their imprints on native art as bright souvenirs of happy occasions, while in and out through the various patterns threaded the lover with the emblem of his passion in the shape of a bright red heart.

The media for this naive folk expression was determined by the local availability of materials. Rich clay deposits stimulated the manufacture of pottery, weaving and embroidery provided a natural outlet for the artistry of a sheep-raising people, while carving became the spontaneous expression of the forest dwellers. It is the purpose of this section to discuss the possibilities of paint for the freehand decoration of furniture in the amateur form known as "peasant painting."

Although primitive art, whether applied to the walls of caves, on totem poles, or upon the surfaces of ordinary furniture eventually exhibits national or tribal characteristics, a common feature is its universal reliance upon a relatively small number of colors for decorative effects. This being the case, the purist may argue correctly that equipped with the three primary colors, red, yellow, and blue, plus black and white, he can mix any desired shade, tint or hue and therefore requires

no other paints to produce the bright primitives of decorative folk art. By the same token one might as well forego the comforts of steam heat and running water, because the smaller the number of colors available to the artist, the more of his time will be consumed in mixing operations. The following list while not the basic minimum, can hardly be considered a luxurious selection:

Paints

Flat white paint
Colors ground in japan (or oil)
- Zinc white
- Light chrome yellow
- Medium chrome yellow
- Vermilion
- Alizarin crimson
- Prussian blue
- Raw umber
- Raw sienna

Brushes

Pointed red sable oil brushes
- No. 2
- No. 4
- No. 10

Flat bristle oil brushes
- 1 in. wide
- 2 in. wide

Vehicles

Varnish or linseed oil
Pure turpentine

Final Coat

Clear flat varnish or lacquer

Colors ground in japan dry more quickly than those ground in oil, but if a varnish is used it will retard the drying time. Many furniture decorators prefer spar varnish as a vehicle, on the theory that it will be more wear- and stain-resistant. Whatever the vehicle chosen it should be of the purest quality.

After being used, brushes should be cleaned in turpentine, then washed out with soap and water, and dried on a clean rag. The choice of flat or round brushes in the larger sizes will be decided by personal preference and aptitude.

Not listed are necessities that are available in any household, such as clean rags, a small open oil (or varnish) container, Scotch tape to hold tracings, and a china plate or saucer for a palette. By using an old "slick" magazine for a palette, the top page can be torn off after the day's painting is over, thus eliminating the necessity of scraping the palette with a palette or putty knife and cleaning with turpentine.

Mixing. The observance of color harmonies on the part of untutored peasant artists was purely instintive, for theirs was a nonchalant art whose natural exuberance directed the work-gnarled fingers in the mixing of bright colors reflecting the remembered gaiety of sunlit days. A glance at the color wheel in Figure 5.11 will not be amiss, however, when planning background effects with reference to the colors in the primary element of the design, or to the room where the finished article is to appear. Often primitive decorations were executed in what is termed a *triad* harmony of any three of the colors located by the points of an equilateral triangle whose center is pivoted to the center of the wheel. Used singly, as "accent

pieces," gaily painted furniture is not overpowering and need not blend into its surroundings. It should not create a disharmony, however, which can be easily prevented where the color scheme of the room and its accessories are known in advance.

Courtesy Ponderosa Pine Woodwork Association

Fig. 5.13. Stylized peasant painted chair and decorated chest.

Designs. The enthusiastic folk artists usually regarded the blank surfaces on the furniture which they set out to decorate as "canvases" which they attempted to entirely cover with some form of painted decoration. In so doing they were frequently forced to add a secondary element to eke out the focal point provided by the large primary elements of the design, in order to fill in the corners and other irregularly shaped blank spaces.

Balance. A better plan is to select a motif that will comfortably fit into the available square, rectangle, oblong, or oval space. This can be enlarged, extended, or even distorted horizontally or vertically to make it fit, or it may be combined with other designs in order to fill completely the panel, cabinet ends, or drawer fronts.

The Pennsylvania Dutch decorators, in common with most primitive designers, usually formalized their motifs so that a line drawn through the center divides the design into two equal parts of the same number of birds, flowers, hearts, or stars. Whether the parts face each other or are back to back, they are said to be in bisymmetrical balance.

Lest the reader lose interest at this point because of an admitted inability to draw "the back side of a barn," let it be stated here that the freehand characteristic of peasant painting need be no insuperable stumbling block to the interested beginner. If he or she subscribes to the principle that satisfactory stencils can be traced, cut out, and painted by any artless amateur, the same procedure can be applied to the art of peasant painting. Designs are available in photographs of museum pieces, as well as in books and magazines; they can also be obtained at full size ready for tracing. A combination job of stenciling and tracing directly upon the surface to be decorated can be instituted for large operations, such as sets or gift pieces. Illustrations can be "blown up" and traced by means of squares or the other methods discussed in Chapter 1.

Having selected a happy color harmony mechanically by means of the color wheel, all that remains is to mix the color on the palette, dipping the brush sparingly into the small container of varnish (or linseed oil) thinned with turpentine, so that the resulting dab of mixed paint retains a heavy brushing consistency that will not run along the traced or stenciled pattern. Figure 5.14 shows a systematic method for locating the colors on a palette.

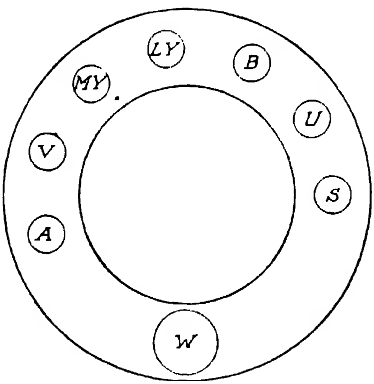
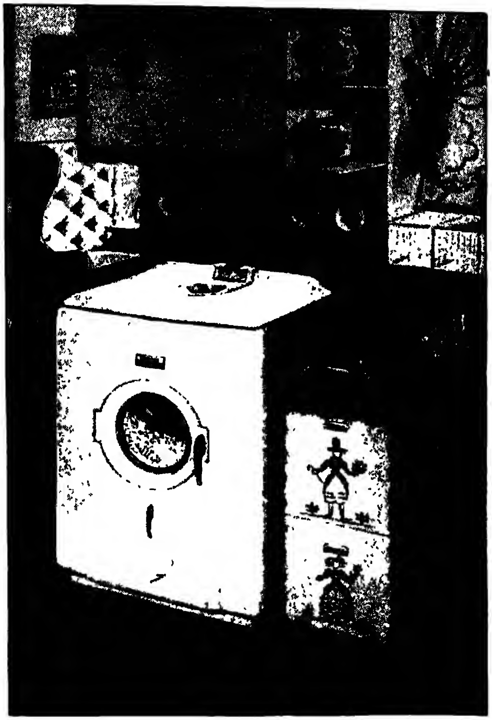


FIG. 5.14. Suggested arrangement of palette.

For the more adventurous, Peter Hunt in his "Workbook" prescribes a free-hand technique built up from a "basic stroke" like an exclamation point, made by a gradual pressure of the pencil brush from a light beginning to a heavy blurb at the end, or vice versa. By curving, combining and accenting these basic strokes, he achieves the exuberant yet nonchalant "little chuckles" that have so justly popularized his unsophisticated effects.

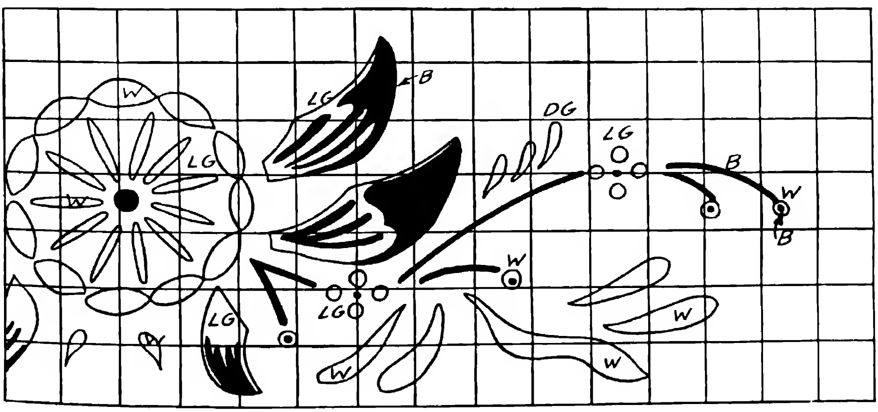
In the diagrams that follow (Figures 5.15–5.18), typical examples of various countries are illustrated as a visual reminder that a choice of design should be made and studied. Owing to limitation of space, only the decoration of the Pennsylvania Dutch hope chest in Chapter 2 will be covered in detail, because the design is indigenous to our own country.

Decorating Pennsylvania Dutch Dower Chest. With its eight almost identical panels, the chest described in Chapter 2 is an easy project for a decorative effect, which can be further simplified by cutting a stencil for the single panel



Courtesy Bendix Home Appliances, Inc.

FIG. 5 15. French peasant decorations in the kitchen.



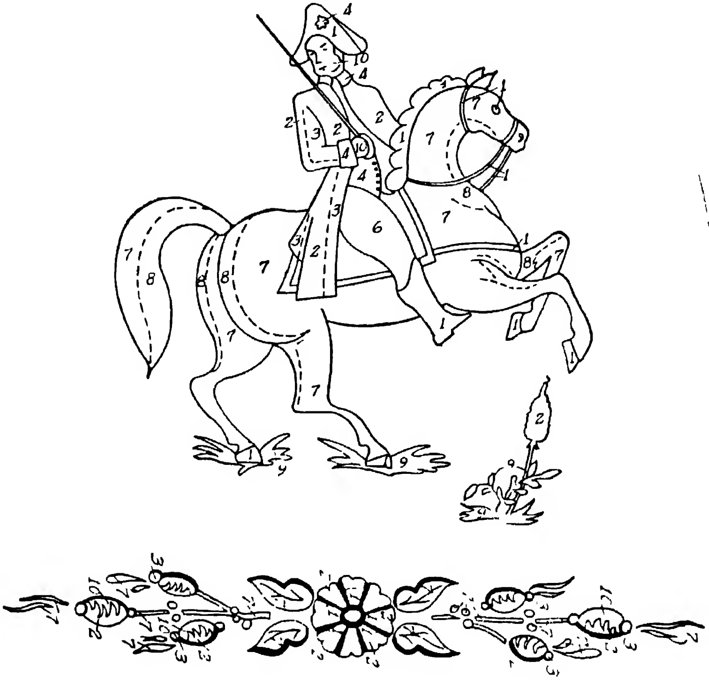
½″ squares

W—white	LG—light green
B—black	DG—dark green

FIG. 5.16. Center splat, Mexican side chair.

design. For the purpose of instruction, however, it will be supposed that the design is to be traced in place.

After the outside of the chest has been thoroughly sanded and all cracks and nail or screw holes filled flush, it may be sealed with a wash coat of shellac unless



Courtesy The American Home, Designed by Joe Watson

FIG. 5.17. Swedish Interpretation.

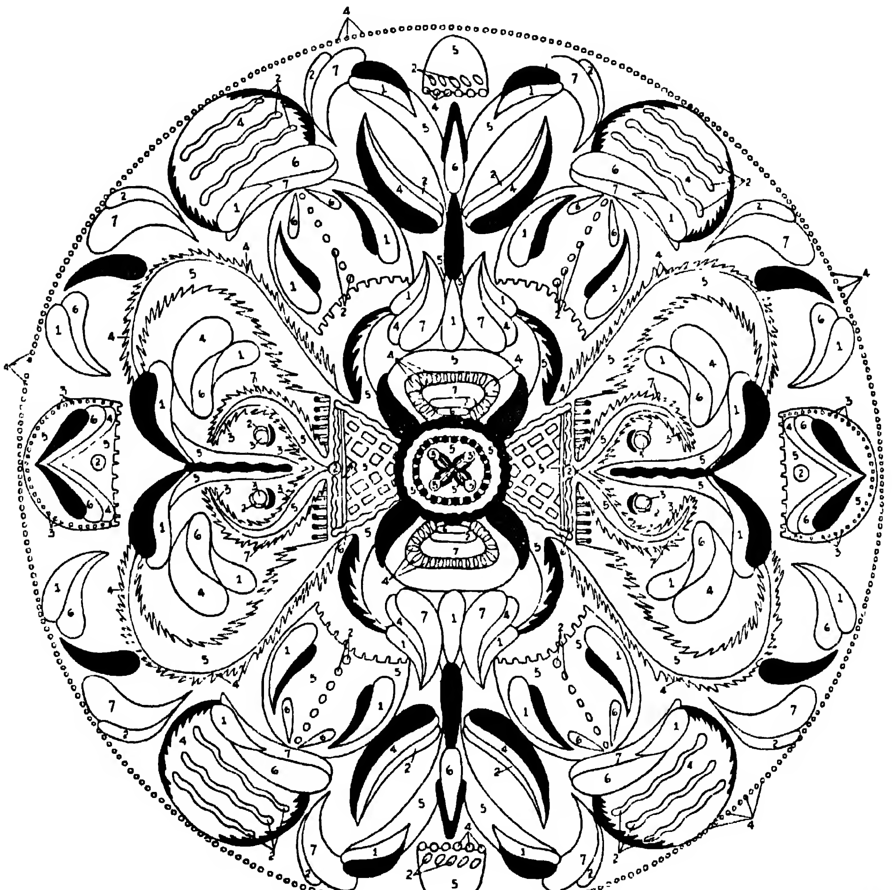
Color Key

1. Black
2. Alizarin Crimson mixed with a little Prussian Blue
3. Alizarin Crimson mixed with White
4. Cadmium Yellow mixed with Burnt Sienna and White
5. Cadmium Blue mixed with more White.
6. Prussian Blue mixed with White and a little Crimson
7. White with a touch of Black
8. White mixed with more Black
9. Viridian Green mixed with more White
10. White mixed with a touch of Crimson and Burnt Umber

it was made of wood having large pores requiring a filler and sealer. The top, stiles, rails, and base are then covered with at least two coats of blue-green paint mixed from a good quality of flat white paint colored with Prussian blue and medium chrome yellow, cooled with a dash of raw umber. The panels are painted

in a light ivory made up from flat white tinted with raw sienna, toned down with umber. Since subsequent varnishing and glazing operations will darken and yellow the final colors, sample daubs should be tested on a folded newspaper.

The design shown in Figure 5.19 has been adapted from a chest panel in the Philadelphia Museum of Art, featuring the principal decorative symbol of Penn-



Courtesy The American Home, Designed by Virginia Sutton

FIG. 5.18. The Russian Influence.

Color Key

1 White
2 Cadmium Yellow
3 Pink (Mix Cadmium Red and White)
4. Cadmium Red (Medium)
5. Medium Blue (add a little White to Cobalt)
6. Light Blue (add more White to the above)
7. Blue Green (Mix Cobalt, Viridian and White)
8. All filled-in areas are painted Black.

sylvania Dutch art, the tulip, in the favorite colors of red, green, yellow, brown, and black. Since the pattern is identical for the five panels, it should be "blown up" by squares to the exact size of the panel on a piece of tough paper which can be used as a tracing medium five times. Fastened in place over the ivory panel with Scotch or decorator's tape over a piece of ordinary carbon paper, the design can be traced with a hard 3H pencil. If carbon paper is not readily available the

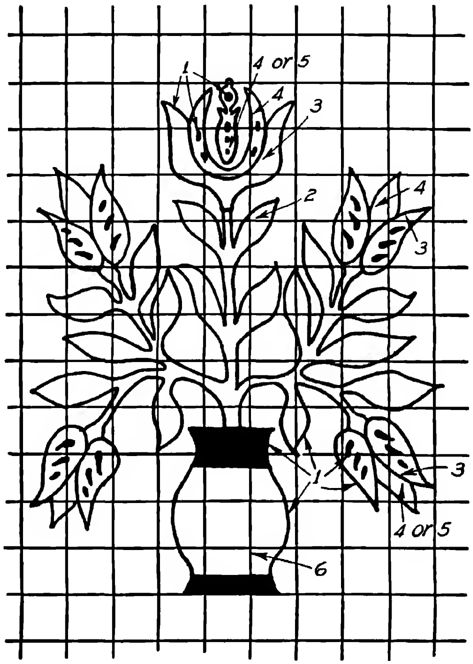


Fig. 5.19.

1. Black
2. Green
3. Red
4. Yellow
5. Blue
6. Brown

reverse side of the pattern can be blackened with a soft pencil. White transfer paper is used to trace the design on a blue-green top of the chest, or the reverse side of the pattern can be covered with white chalk, which will adhere when the design is traced.

A suggested color key is shown with each pattern. As the amateur painter becomes more confident, he will select his own color combinations. Although many peasant artists used nature's colors as a guide, just as many allowed the whimsies of fantasy to color their leaves blue, birds green, animals lavender and flowers in a variety of hues.

The same thing is true of the outlines. As the hobbyist becomes more adept,

his brush strokes will take on more confident sweeps, with the result that many will flow well past the tracing or stencil marks, changing the exactitude of the formalized symmetry that was his original goal. So much the better, for this is the approach to freehand decoration which, however bisymmetrical its conception, often distorted or even deleted some detail by the very boldness of its application.

Pennsylvania Dutch decoration depended for unity, in great part, on tying in the various elements of the design by means of heavy black outlines. These and the various contrasting colors cannot be added until adjacent colors are dry.

The design for the top of the chest is a good example of how a primary motif can be elongated, distorted and augmented to fit a differently shaped surface, as indicated in Figure 5.20. Because of the dark background bright tints must be used.

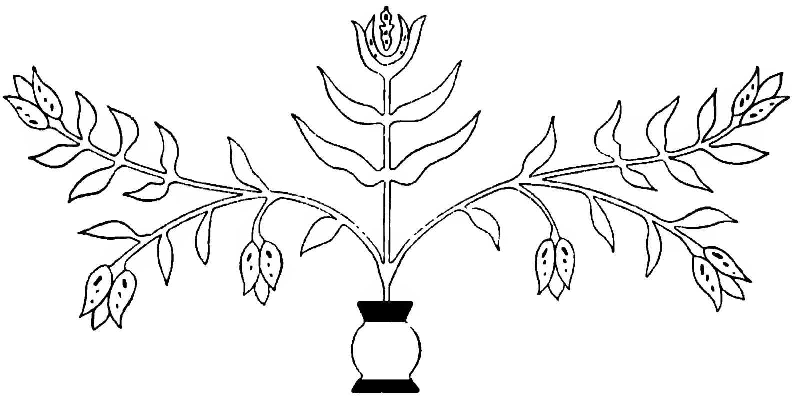


FIG. 5.20. Design expanded for top of dower chest.

A good protective finish is provided by a coat of clear spar varnish upon which the antique glaze can be applied, as previously described. A final coat of flat, satin finish will eliminate a possibility of rubbing through into the design. Additional protection and softening will be afforded by a wax coating.

Available Furniture. Nowadays almost every department store carries a line of low-priced, unpainted furniture whose "bright" surfaces literally beg for decoration. Old, discarded pieces which have been simplified with a screwdriver or a few saw cuts, as discussed in Chapter 9, can be completely disguised with peasant painting. Although it is perhaps safest in the long run to remove the old finish down to the bare wood (see Chapter 8,) yet much elbow-grease can be saved by sealing in the original finish with a coat of aluminum paint.

If such a procedure is decided upon, the old surface should be sanded with coarse sandpaper to provide sufficient tooth for a good bond. After a thorough dusting, all surfaces are wiped off with turpentine or benzine to insure that no grease or dirt remains. The aluminum paint usually comes in two cans, the top one containing the aluminum paste which must be stirred into solvent from the

Representative Standard Finishes

Wood	Natural	Opaque	Color	Finish	Water or NGR Stain	Penetrating Oil Stain	Pigment Oil Stain	Spirit Stain	Filler	Bleach
Mahogany	Yes	No	Sheraton	Light brown Mahogany	Preferred	Seldom	Optional	Seldom	Medium	No
			Brown							
			Colonial							
			Old World or							
			French Provincial				Yes		Red; reduced	
			Harvest Wheat	None	Optional	No	No	No	Raw sienna	Yes
			Heather						White	
			Tweed						Red	
			Pickled				Yes		Natural	
Walnut	Yes	No	American	Dark walnut	Preferred	Seldom	Optional	Seldom	Medium	No
			Antique	Light or dark walnut						
			Old World or	Light walnut			Yes		No	
			French Provincial							
			Ambered	Light or dark amber	Optional	No	No	No	Burnt umber	Yes
			Pickled	None	No		Yes		Natural	
Maple	Yes	Optional	Pilgrim	Dark amber	Preferred	Optional	Optional	Seldom	No	No
			Honey Tone	Light amber			Yes			Optional
			Cottage	Medium amber and red						No
Oak	Seldom	No	Golden	Golden oak	NGR	Optional	Optional	Seldom	Thick	No
			Light and dark	Light and dark oak						
			Early English	Light walnut						
			Swedish Provincial							
			Brown Flemish	Dark walnut			Yes		No	
			Flemish	Black			Optional		Thick	
			Weathered	Gray-brown						
			Mission	Red-brown						
			Bog	Green						
			Pickled	None			Yes		Natural	Yes
			Frosted (Limed)	Gray, green or blue			No		White	Optional

Wood	*Natural*	*Opaque*	*Color*	*Finish*	*Water or NGR Stain*	*Penetrating Oil Stain*	*Pigment Oil Stain*	*Spirit Stain*	*Filler*	*Bleach*
Birch and Gumwood	No Optional	Yes	Mahogany Walnut Maple French Provincial	Mahogany Walnut Amber Light walnut	NGR	Optional	Yes	Seldom	No	No
Beech Basswood	No	Yes	Maple Walnut	Amber Walnut	Optional	Optional	Yes	Seldom	No	No
Pine	No	Yes	Maple Pickled	Amber Gray	Seldom	Optional	Yes	Seldom	No White	No If required
Spruce Fir	No	Yes	Maple Walnut	Amber Walnut	Optional	Optional	Yes	Seldom	No	No
Redwood	Yes	Yes	Mahogany Walnut	Mahogany Walnut	Optional	Yes	Yes	Seldom	No	No
Poplar	No	Yes	Maple Walnut Fruitwood	Amber Walnut Orange undercoater	No	No	Yes	Seldom No	No	No
Cedar	Always	No	None	None	No	No	Optional	No	No	No

lower can in a clean empty can or other container, to make a smooth liquid. Only enough should be mixed to do the job.

After the aluminum paint has been brushed on and thoroughly dried, it should be lightly sanded before the priming coat of paint or the undercoater is applied. A second coat of flat paint will complete the ground, ready for decorating.

6

VENEERS AND INLAYS

VENEERS

PRACTICED by the ancient Egyptians, the art of veneering came into high repute, via France, during the eighteenth century under the skilled hands of Hepplewhite and Sheraton. Nowadays the availability of plywood surfaced on one or both sides with a wide selection of native and imported veneer woods has relieved home craftsmen of much of the time-consuming gluing and pressing required for a satisfactory veneering job.

From the standpoint of expense, however, veneering has afforded many a hobbyist the means of producing a richly finished product whose foundation is composed of low-priced woods. This is not to imply that veneering, in its correct application, is a mere sham. Many woods possessing a beautiful figure, such as burl walnut or crotch mahogany, are notoriously unreliable and cannot be used in solid form because of their tendency to warp and crack. Again, many delightful effects are possible only in veneer. These include built-up designs where the grain of the various parts runs in different directions, or rich patterns that are produced when different woods are combined. From a commercial standpoint veneering of this type costs as much as, if not more than, solid wood, and if properly applied is equally reliable.

Veneer Woods. In addition to the native woods listed in Chapter 1, the following are popular for veneering and inlays:

Name	*Origin*	*Description*
Acacia	U.S.A.	Varies from light brown to red and green, with a figured grain.
Amaranth (Purpleheart)	Dutch Guiana	Exotic violet purple.
Amboyna	Amboyna	Curly figure on shaded light brown.
Applewood	U.S.A.	A dense, grayish brown, without grain.
Aspen	U.S.A.	Light brown stripes on light background; silky texture. Crotch cut very decorative.

Name	*Origin*	*Description*
Avodire	Africa	Blonde with fairly distinct grain.
Balustra	South America	Light brown, dense, hard and oily.
Benin (African Walnut)	Africa	Medium warm brown shading richly into occasional lighter stripes.
Blackwood	Australia	Thin parallel close brown stripes on light background occasionally cross-rippled.
Boxwood	West Indies	Dense, light colored, grained. Inlays.
Bubinga (African Rosewood)	Africa	Cloudy striped grain on red-brown.
Carpathian Elm	France	Medium brown with small burls.
Coco Wood	India	Purplish stripes on medium dark ground. Hard and brittle.
Ebony	Gaboon	Rusty brown-black. Expensive.
	Macassar	Deep chocolate strips on lighter brown. Hard and brilliant.
Faux Satine (False Satin)	U.S.A. England	Crotch cypress.
Goncalo Alves (Bossona)	Brazil	Black and brown streak on reddish brown. Hard and liable to crack.
Harewood	England	English sycamore dyed silvery gray.
Holly	U.S.A.	Whitest and least grained wood.
Kingwood (Violetwood)	Brazil	Walnut or red-brown ground with distinctive pigmented figure.
Koa	Hawaii	Reddish stripe on yellow-brown. Cross ripples give plaid effect.
Lacewood (Silky Oak)	Australia	Eccentrically pockmarked, lacy effect.
Laurel Wood	India, Africa	Yellowish brown with grain like walnut.
Madrone Burl	U.S.A.	Delicately figured on pale brown ground.
Mahogany, Crotch	Africa, Cuba	Dark crotch figure on rich mahogany ground.
Maple	U.S.A.	Curly, fiddleback, bird's-eye and burled.
Myrtle, Burl	U.S.A.	Blonde, highly figured in various designs.
Oak, Quartered	England	Tobacco brown, evenly grained.
Oak, Burl	England	Brown burled figure on light oak background.
Oak, Pollard	England	Small grained, brown.

Name	*Origin*	*Description*
Olivewood	Italy	From a small tree, hence small patterns.
Orientalwood	Australia	Dark walnut-colored, medium grain figure.
Padouk (Vermilion)	India	Bright orange-red on pinkish ground.
Pearwood	Europe	Dense. Dull orange-colored.
Prima Vera (White Mahogany)	Mexico Guatamala	Pale brown with grain like mahogany.
Redwood Burls (Sequoia)	U.S.A.	Warm orange-brown with small pattern.
Rosewood	Brazil	Hard and heavy, purplish brown with black stripes.
	E. Indies	(Palisander) Less color but definite combed grain.
	Honduras	Lighter and more uniformly grained than Brazilian.
Sapeli	Africa	Similar to mahogany but more evenly striped.
Satinwood	Ceylon E. Indies W. Indies	Highly figured light yellow and golden brown with satiny finish.
Snakewood	Surinam	Rich brown with snakelike stripes.
Sycamore	England	Light pinkish tone.
Tamo	Japan	Ash with wild "peanut" figure.
Teak	India Burma Java Malay	Light tobacco brown. Resists humidity.
Thuya, Burl	Africa	Tobacco brown with darker figure.
Tulipwood	Brazil	Red and purple stripes on yellowish ground.
Vermilion	Africa	Bright brick red with indistinct grain.
Yuba	Australia	Orange brown, sometimes mottled.
Zebra Wood (Zebrano)	Africa	Deep brown stripe on light brown ground.

Methods of Cutting Face Veneers. Commercial requirements and the characteristics of the log determine which of the six types of veneer cutting will be employed. Since the standard American thickness for face veneers is 1/28 in., knife cutting by far is the most economical method.

Rotary cutting **is the oldest and most common method of cutting by knife.**

The log is mounted on a lathe that turns against a razor-sharp knife edge to peel off sheets of veneer, producing a swirly, variegated grain-marking as the knife travels along the arc of the annual growth rings.

Half-round rotary cutting produces a much milder figure displaying more heart character, because the half log is mounted to an eccentric device which permits the knife to cut in a wider sweep, off the line of the arc of growth in the annual rings.

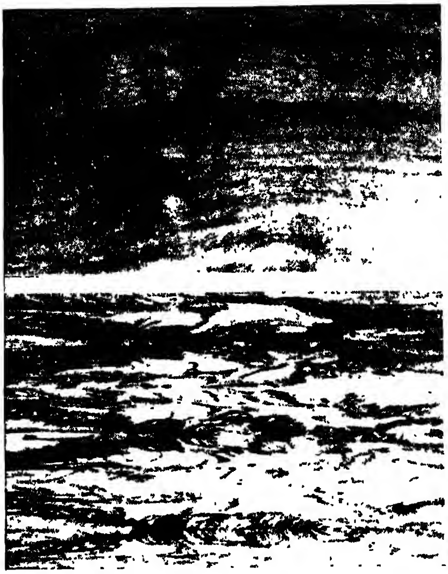
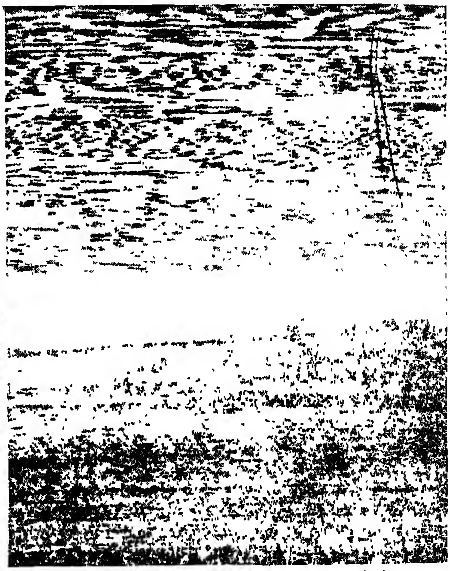


FIG. 6.1. Top: Pigment figure in Circassian walnut. Bottom: Pigment figure in a panel of matched red gum veneer.



Courtesy Forest Products Laboratory

FIG. 6.2. Top: Stripe figure in tanguile. Bottom. Stripe figure in black walnut

Back cutting on rotary is the reverse of half-round rotary cutting in that the bark side of the sliced log is fastened to the eccentric device so that the knife slices into the heartwood first, instead of the sapwood. The resulting cut against the annual rings produces an enhanced striped figure.

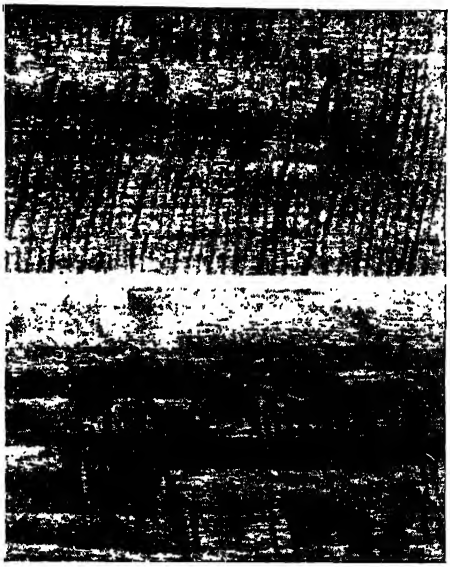
Flat slicing requires prior softening of the logs by steaming. They are cut longitudinally into "flitches," steamed in large vats, trimmed of their bark, and fixed horizontally in a movable frame that can be brought down against the cutting edge of a long stationary knife to shave off veneers at any desired thickness between 1/100 to 1/20 of an inch.

Quarter slicing is the most expensive of knife-cutting methods since it employs the flat-cutting technique on quarter-cut flitches. Cut approximately at right angles to the annual rings the resulting veneer contains straight stripes running

its entire length. This method also produces flakes in woods having prominent rays.

Sawing is the oldest method of veneer cutting. It is also the most extravagant because the saw kerf is sometimes equal to the thickness of the resulting veneer. The log or flitch is cut cold, mounted on a traveling carriage that moves back and forth against the saw blade as it cuts through from end to end. Sawing is used for thick veneers, which are difficult to handle when cut with a knife.

Figured Veneers. As discussed in Chapter 1, the beauty of wood is derived



Courtesy Forest Products Laboratory

FIG. 6.3 Top Broken strip in quarter-sawed mahogany. Bottom: Mottle figure in quarter-sawed mahogany.

FIG. 6.4 Top. Fiddle-back figure in mahogany. Bottom Raindrop figure in mahogany.

from its figure, the pattern formed by the annual growth rings and the medullary rings. Strangely enough the beauty of this basic figure is enhanced by the irregularities produced by the infiltration of coloring matter in the pigment figure, and irregularities of growth such as cross grain, wavy grain, burls, knots, crotches, stump wood, and other distortions of the fiber growth. Some of the more outstanding deviations are shown in Figures 6.1-6.6. The various figures made by irregularities are listed in the accompanying table.

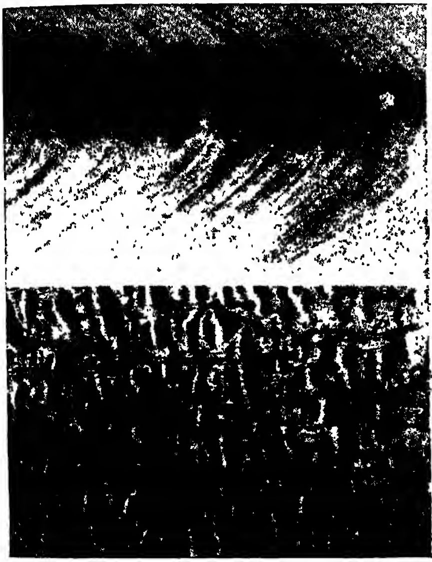
Veneer Matching. The art of matching veneers has been developed to such a high degree of perfection that almost any desired effect can be obtained from the wide diversity of figure types available. In addition, adjacent veneers from the same flitch facilitate matching into attractive symmetrical designs. There are three general methods of matching veneers:

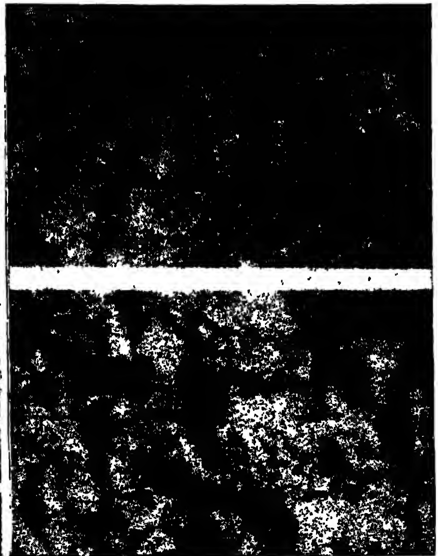
Figured Veneers

Figure	*Description*	*Source*
Crotch	Crushed and twisted fibers	Fork of tree
Swirl	Outer sides of crotch block	Crotch or twisted limb
Stump (butt)	Wrinkled grain	Lack of room for roots. Swaying
Burls	Tumors or warts	Pathological or mechanical disturbance
Plum pudding	Dark oblong spots surrounded by wavy or burly grain	Buds beneath maple bark
Curly or wavy grain	Curls across the grain	Unnatural growth in Cuban mahogany
Fiddle-back	Fine, regular wave of varying size	Natural grain showing well in quartering
Roll	Wider waves than fiddleback	Like fiddleback
Blister	Wide short rolls with narrow depression between	A grain best shown by flat or rotary cutting
Stripe or ribbon	Alternating light and dark full-length stripes from ¼ to ½ in. wide	Reflection of light from adjacent layer of interlocked grains
Broken stripe	Stripe broken at irregular intervals	Interlocked grain cut on the quarter
Rope	Stripe broken in only one direction	Common in avodire; mahogany occasionally
Mottle	Straight or broken stripe further broken by short waves or curls into "block," "bee's wing," "roe," and "raindrop" figures	Natural graining in a variety of patterns
Oystershell	A small figure used in inlays	Angling across sections of limbs or small trees
Shell cut	Shell or leaf figure	Cut on the bias
Conical cutting	Similar to shell	Spiral lathe cutting
Knotty	Most desirable when scattered	Pine or spruce

Book matching is used when two adjacent sheets of veneer, as they are cut from the same flitch, are opened like a book when taped side by side along a common edge.

End matching is similar to book matching except that the ends are taped to form the hinge. A book match combined with an end match makes a *four-way match.*





Courtesy Forest Products Laboratory

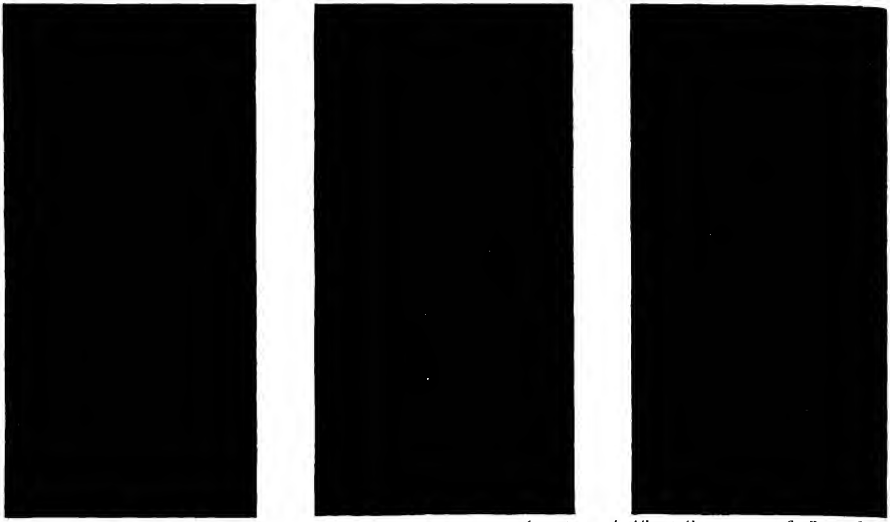
FIG. 6.5. Top: Crotch figure in mahogany. Bottom: Blister figure in mahogany.

FIG. 6.6. Top: Cherry burl. Bottom: Bird's-eye maple.

Slide matching is accomplished by sliding the top sheet of veneer into a side-by-side position with the next sheet, arranged in the order of cutting.

Diamond Match. When matching four identical pieces of veneer in either the four-way match, the diamond match, or the reverse diamond (Figure 6.7,) two small mirrors set at right-angles as in Figure 6.8, will facilitate the selection of the cutting lines. In cutting veneers, allowance must be made for the fact that each sheet contains an almost identical pattern.

Cutting Veneer Patterns. For the diamond or reverse diamond pattern, the four pieces must be cut from matching grains. A method of cutting all four pieces from one piece of veneer having a straight parallel grain is shown in Figure 6.9. If the available veneer is too narrow to accommodate all four sections full length, the top (or bottom) triangular corners may extend beyond the top (or bottom) edge of the veneer, and be completed later with well-matched triangular patches cut from the waste.



Courtesy of Albert Constantine & Sons, Inc.

FIG. 6.7.

The popular herringbone pattern is cut in the same manner and reassembled with alternate sections displaying opposite grain angles, as in Figure 6.10. Thin veneers can be cut with heavy scissors, a sharp knife, or a veneer saw.

Panel Construction. Although the home craftsman can now procure ready-made plywood panels in a variety of finishes, from time to time he may be faced with the necessity of gluing up a special panel, such as one containing a diamond match on one side, a checkerboard or backgammon pattern, or an inlaid picture

Courtesy of Albert Constantine & Sons, Inc.

FIG. 6.8.

for the combination card table and fire screen described in Chapter 2 (page 100). While plywood core stock is commercially available, ready for gluing on face and back veneers, a short discussion of the make-up of plywood panels is believed appropriate at this point.

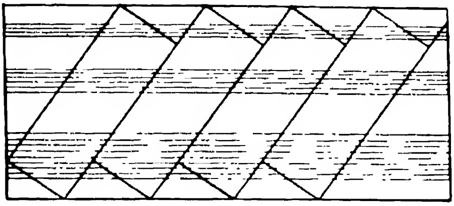


FIG. 6.9. Cutting four pieces for diamond pattern from single piece of veneer.

Cores may be of veneer or lumber, depending upon the ultimate thickness of the panel. Since veneer always tends to pull the groundwork hollow, plywood panels have veneer on both sides of the core. When only one side of the carcass or frame of a piece of furniture is to be veneered, it should be constructed with

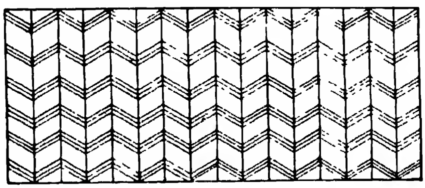


FIG. 6.10. Herringbone pattern.

the heart side on the exterior, so that the pull of the veneer will counteract the tendency of the solid stock to bow out away from the heart as it shrinks. As pointed out in Chapter 1, the best method for compensating against this arching action in shrinkage is to edge-glue strips of 3 to 4 in. wide core stock, alternating the heartwood and sapwood surfaces, as in Figure 6.11.

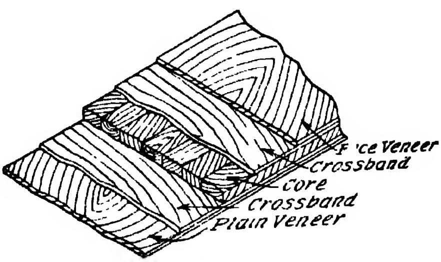


FIG. 6.11. Composition of veneered panel.

Crossbands. Whether a veneer or a lumber core is used, the resulting panel should emerge with a minimum of three layers or plies; 5-ply is better. In the latter case, plies with their grains running at right angles to the core, known as crossbands, are glued to both of its sides. The face (top) veneer and the back (bottom) veneer of the panel are then applied with their grains running at right angles to the crossbands, thus practically eliminating the possibility of shrinkage or warpage.

Edges. As mentioned in Chapter 2, the edges of veneer core panels are frequently finished in black or raw umber to disguise the veneer plies. Other methods described under various projects included veneering the edges in which case the corners were mitered and the end grain well sized; and inserting a wood edging into a dado in the core (A of Figure 6.12.) A better practice is to insert the edging before the face and back veneers are applied, as in detail B. The edges of a lumber core panel can be molded and finished as in the case of solid stock.

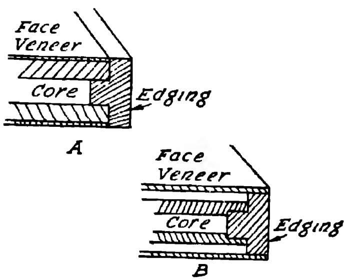


Fig. 6.12. Rabbeted edging.

Flattening Veneers. Crotch and burl veneers as previously mentioned are apt to warp and must be straightened before they can be applied. This can be accomplished by applying a glue size made by mixing 1 part of casein glue with 4 parts of water by weight, then slowly adding 2½ parts of alcohol and 1½ parts of glycerine. Proprietary preparations are also available. All veneers should be stored flat between boards to prevent warping. Sponging both sides and pressing between boards will straighten out thin veneers.

Application of Veneers. Regardless of the method employed, the solid groundwork or surface upon which the veneer is to be applied must be planed and smoothed dead true. A straightedge should be applied in all directions to insure a perfectly flat surface, which is then sanded with a coarse abrasive to provide tooth for the glue bond.

Glue may be the familiar casein or a synthetic resin. Both are applied cold and only to the core or groundwork, not to the veneer, when a press or clamps are used. Hammer veneering, on the other hand, uses hot animal glue, which is applied to the veneer as well as the groundwork.

Hammer Veneering. This method has the advantage of requiring little in the way of apparatus. The hammer, shown in A of Figure 6.13, is really a presser or stationary squeegee, and can be made from a piece of ¾-in. stock 3¾ in. by 6 in. with a ⅙-in. brass strip let into a saw kerf in the bottom edge, and an 8-in. handle wedged into place near the top.

To apply two pieces of matching veneer to a solid core by the hammer method, the first care is that the grain of the core or groundwork be at right angles to the grain of the veneer. The veneer is cut about ½ in. full all around, and both

ground and veneer are brushed with hot animal glue and one section of veneer spread in place. Since the glue cools during this operation, the veneer can be sponged with water to prevent burning, and liquefied by passing a heated flatiron over the surface; the iron should be comfortably warm when held a few inches from the cheek. The veneer is then pressed into place with the hammer, working with a zigzag movement (B, Figure 6.13,) from the center outwards, so that all surplus glue is forced out. After the glue has dried for 24 hours, the work is

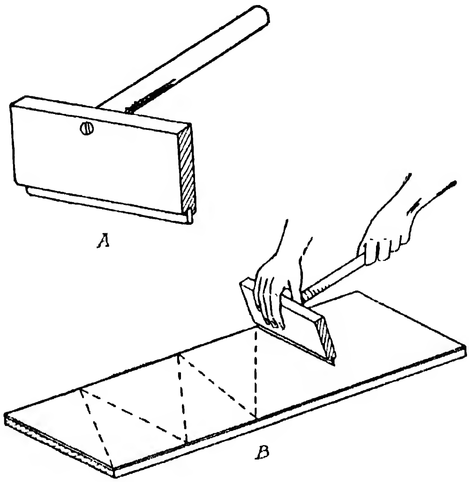


FIG. 6.13. Veneer hammer.

turned veneer side down on a flat surface and the overhang cutoff with a sharp knife, chisel, veneer saw, or bench saw. An old straight razor with the front corner of its edge ground round makes an excellent veneer cutter. To plane the edges smooth, the finished work can be clamped in a shooting board (Chapter 1) under a straightedge, or both edges planed smooth in one operation as in C of Figure 6.14.

In order to insure the accurate jointing of the two pieces of veneer, the second section is glued in similar fashion with a 1-in. overlap. A straightedge is then clamped firmly along the center of the overlap, a cut made through both thicknesses of veneer, and the upper piece of waste peeled off. To get at the lower piece the glue must be softened with a touch of the warm iron so that the upper veneer can be raised. After the lower piece of waste is stripped off, both edges are dampened, heated, and hammered flat, and a piece of gummed paper, (6.14 d) fastened over the joint to prevent it from opening as the glue dries.

Caul Veneering. Although commercial plywood is habitually glued under pressures up to 100 lbs. per sq. in., the home craftsman can turn out a thoroughly satisfactory panel or veneer job if he allows one hand clamp for each 40 sq. in. of

surface. If press screws are used, the area can be doubled because of the extra pressure exerted. By using bench screws instead of the rotary handled press screws, a veneer press can be easily built up from a series of simple frames like

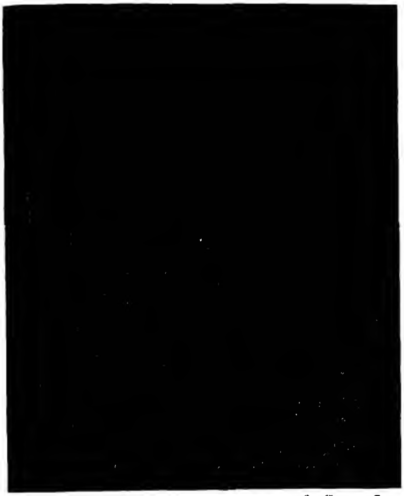
A

B

Courtesy of Albert Constantine & Sons, Inc.

C

Fig. 6.14.



Courtesy of Albert Constantine & Sons, Inc.

FIG. 6 14*d*

the one illustrated in Figure 6.15. To resist a pressure of about 4500 lb, the two crossbars for an 18-in. span with two screws should be of hardwood not less than 3 in. by 3½ in.; for a three-screw span of 30 in., the dimensions of the crossbars should be increased to 3½ in. by 4¾ in.

Improvised Presses. For small work a satisfactory veneer press can be improvised by placing the work on a flat board on the floor, directly under a floor beam. Using a 4 × 4 or two 2 × 4's as a bearer, an automobile jack under a long 2 × 4 reaching to the floor beam will exert the necessary center pressure. C clamps can be used to hold down the edges, and folded newspapers under the plank "bearer" will compensate for uneveness in the floor.

In an emergency, sand bags will give satisfactory results on small jobs, or piles of bricks, or a washboiler filled with water.

In using a veneer press or any sort of pressure screws or clamps, the veneer is laid on a flat "caul" or board and covered with another caul. Cauls of ¾-in. plywood are now finding favor in many home workshops. The lower caul rests on solid stock bearers, or the lower crossbars of the veneer press. Directly above the bottom bearers are the bearers upon which the pressure is exerted. As indicated in Figure 6.16, these top bearers are crowned or slightly arched in the center, so that pressure will be exerted upon the center of the glued area first, forcing the glue out toward the edges. For the same reason the pressure screws, bench clamps, hand clamps, or C-clamps controlling the center bearer are screwed down first. It is wise to insert a folded newspaper between the veneer and its caul, to take up the squeezed-out glue.

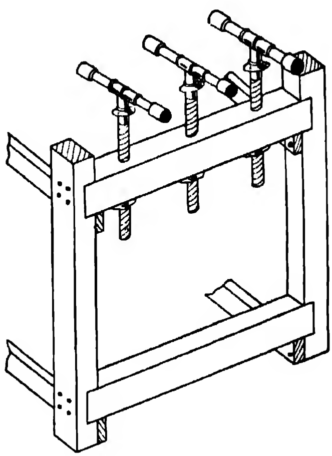


FIG. 6.15. Veneer press frame.

In assembling a diamond pattern with inlay bands and crossbands or borders around the edges (Figure 6.17) it is good practice to lay out the design on a full-sized paper pattern, using dabs of glue or pushpins to hold the various pieces

tightly in place while gummed paper is applied to the joints. Some craftsmen prefer to fit the inlay bands and crossband borders as the work proceeds, cutting the main veneer scant so that after it has been glued, waste pieces can be cut

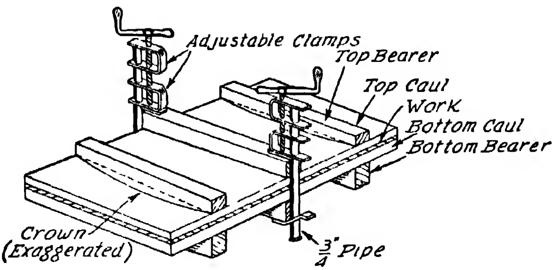


FIG 6.16. Use of cauls and crowned bearers.

with a cutting gage pressed against the edge of the core, then peeled off to leave space for the inlay bands and the borders. In this method the corners of the bands and borders are mitered as the work progresses, in the same manner as the overlap was cut for jointing the two veneers in the hammer method of veneering. Care must be exercised to match the inlay band at its mortised corners, that is to say, the miter must be cut through a single portion of wood so that it matches on both sides of the corner. The crossbanding should also be selected so that the grains of adjacent strips will match at the corners like a reverse diamond pattern.

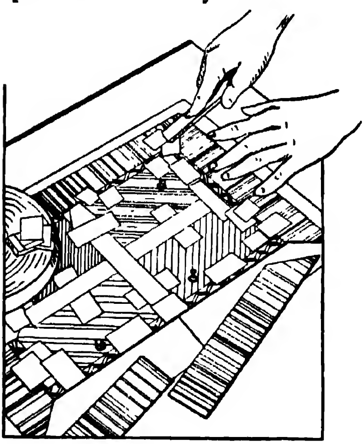


FIG. 6.17. Assembling diamond match with inlay bands and crossbands.

To prevent slippage during pressing, veneer pins or phonograph needles are used to hold the pieces in place on the groundwork. Light brads or picture frame nails with their heads nipped off can also be used to advantage. These projecting pins are pressed into the cauls with the hands prior to placing the work in the veneer press, and can be punched home after the glue is dry and the cauls removed.

Veneering Curved Surfaces. Modern furniture design makes considerable use of curved surfaces, especially at the corners of its popular recessed bases. Modernization of the unit bookcases described in Chapter 2 (page 67) would replace the diagonal cuts of the end sections with quarter-round convex curves, including bases, while the corner section could be constructed with a concave curve. If the laundry hamper described in the same chapter (page 168) were built to

fit into a corner, the front panel as well as the base and top could be constructed in a graceful convex curve. In these cases the amateur veneerist would be faced with the necessity of providing curved cauls.

Tambours. One of the simplest methods of constructing an adjustable curved caul is to cut a series of ¾-in.-square sticks to the proper length, drill them at both ends, and fasten them loosely together by means of cords threaded through the holes and knotted at the ends to form tambours. As shown in Figure 6.18, to

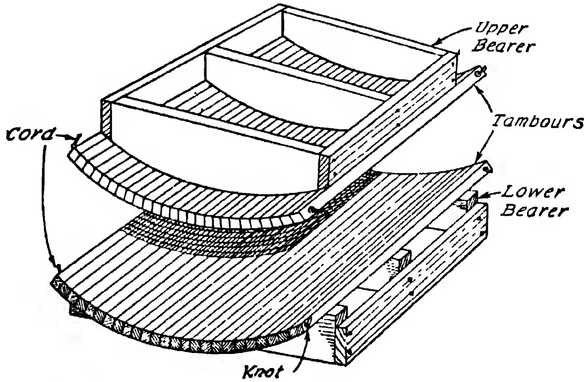


Fig. 6.18. Tambours as cauls in curved panel veneering.

glue up a curved panel, it is only necessary to cut bearers to the proper arc, using the flexible tambours as cauls. Five or more layers of ⅛-in. basswood or poplar veneer are customarily used for the laminated core of a curved panel, with the grains running in the same direction. Glue is applied to both sides of each piece of core veneer and a brad driven through each end, at the center, to prevent slippage. The face and back veneers are then laid on the core, covered with a layer of newspaper, and the whole panel placed between its tambours and curved

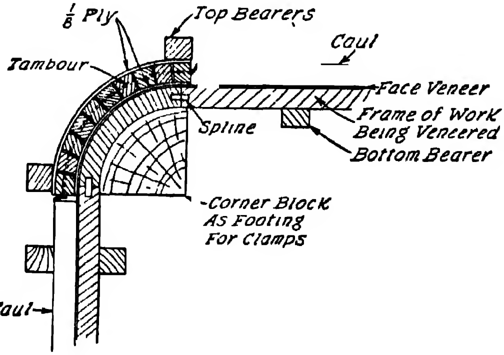


Fig. 6.19. Veneering a hollow corner.

bearers in the press. A curved base can be made in the same manner with a thicker core and no back veneer, or the front of a solid, built-up curved core can be veneered, one outside tambour being used.

The curved corners so dear to the modern furniture designers are usually of solid stock, veneered only on the outside surface. The corner pieces frequently consist of solid pieces that have been turned, ripped into halves, and cove-cut, then quartered. They are then doweled or splined into the straight front- and side-pieces as shown in Figure 6.19. A rounded corner block and bearers are cut for the inside of the solid frame, which acts as its own lower caul, while flat cauls on the flat upper surfaces connect with a tambour at the rounded corner. A piece of 1/8-in. veneer is used to reinforce the tambour, and bearers are placed on the upper cauls to correspond with those on the inner surface.

Certain types of construction such as curved drawer fronts require a solid curved groundwork. When this is cut from boards glued face-to-face on edge, the waste from the band-sawing can be used as the outer caul, if the boards selected are of sufficient extra width.

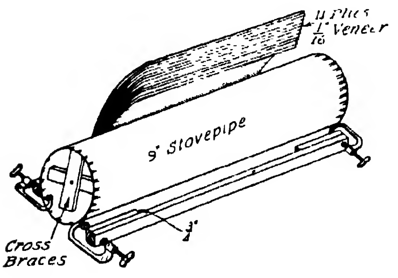


FIG. 6.20. Veneer bending jig.

Laminated veneer construction, similar to that of the curved plywood panel, can be used to replace the rounded corners of solid stock. Built-up from 11 layers of 1/16-in. veneer, it can be formed around a length of 9-in. stovepipe, braced at the ends by crosspieces as shown in Figure 6.20. The 11 veneer plies, 18 in. long, are cut to the desired width and clamped under a crossbar to one side of the stovepipe, as shown. The opposite ends are bent down one at a time and fastened under a second clamped crossbar at the opposite side of the pipe, between two 3/4-in. blocks. By using an additional clamped crossbar midway of the bend, it is possible to glue each lamination as it is bent, using Casophen, USP Resorcinol, Bakelite cold-setting phenolic resin glue, or BC-17613. A less messy method of gluing is to dry-bend and clamp the sheaf of laminations, soak the entire assembly in a tubful of hot water overnight, and after allowing 24 hr. for drying, separate the laminations, gluing them one at a time, then clamping them together.

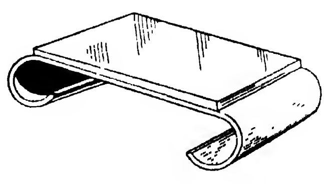
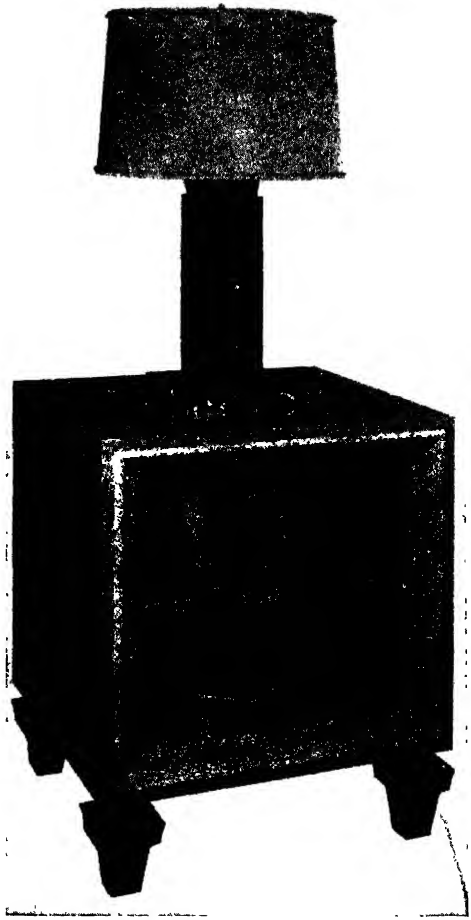


FIG. 6.21. Laminated veneer table

The same principle can be applied to the construction of laminated veneer furniture. The interestingly curved coffee table pictured in Figure 6.21 can be formed over two sections of stovepipe connected by crossbars from the centers of their bracing crosspieces. A piece of plywood to which a Bakelite or a plastic top has been fastened can be glued over the flat center portion to form a stainproof table top.

Decalcomania Transfers. Of recent years there has been developed a transfer method of applying natural-colored prints of actual wood grain compositions upon the lacquer-sealed surfaces of metal, glass, plastic, and inferior wood surfaces.



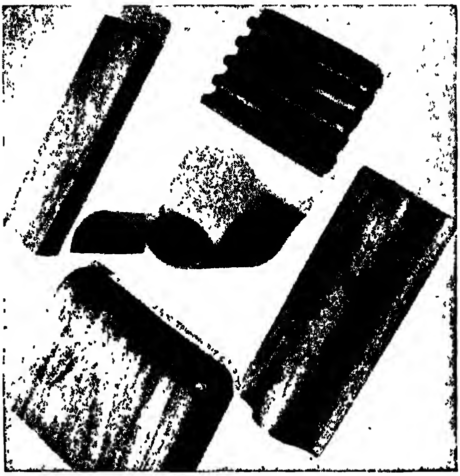
Courtesy The Meyercord Co.

FIG. 6.22 Modern end table and lamp covered with plastic veneer.

These transfers consist of a photographic pattern sandwiched between a clear lacquer top finish under a paper backing, and an exposed lacquer background coating which must be welded to the surface to be covered with a special cement furnished by the manufacturer. When properly applied, the finished surface is a faithful re-creation of a beautifully grained wood (see Figure 6.22) in natural

colors, whose lacquered surface can be glazed, shaded, rubbed or top-coated with wax, lacquer, synthetic resins, or varnish.

Procedure. These plastic veneer films come applied to single (simplex) backing paper or double (duplex) paper, with realistically colored lacquer backgrounds, and are applied to wood surfaces in much the same manner as are the decorative decalcomania transfers. Because the lacquer background will draw down into the pores of the wood as it dries, porous woods must be properly filled, sealed, and sanded smooth, then lacquered.



Courtesy United States Plywood Corporation

FIG. 6.23. Flexmetl, consisting of wood veneer bonded to paper-thin pliable metal.

The thin simplex (single) paper backing can be removed by sponging or soaking it with water. The heavy backing of the duplex (double) paper must be separated at a corner and peeled off to uncover the inner tissue or rice paper, which can be quickly removed when sponged with water. Once the paper has been removed all the dextrine or gum coating should be washed off with water to prevent subsequent crazing.

The coated or colored side of the film is now sponged with the manufacturer's cement diluted with an equal portion of water, and the film or transfer applied at once to the surface to be covered. A rubber roller or squeegee is used to roll the veneer film firmly from the center outward to the edges. Excess welding cement can be wiped off at the edges with a dampened cloth. It is good practice to test the reaction of the undercoat to the diluted cement by dampening the fingers in the latter and touching them to the undercoat, which should soften and show signs of tackiness for proper bonding with the veneer film. Long strips can be transferred to panels like wallpaper; one end is applied to the surface and the

remainder held away from it until the squeegee strokes pull it down against the panel surface.

Plastic veneer strips are available for application as inlay. They are placed in water to remove the paper, then withdrawn and passed through the fingers to eliminate excess water. Meanwhile the cement solution is applied to the surface that is being "inlaid," and the strip rolled into place with the squeegee.

Plastic veneers also come in rich marble designs suitable for table tops, lamps, or imitation fireplaces. Nonporous wallboards "veneered" in marble make luxurious paneling for modern bathrooms.

Cork Veneering. Cork as a finish for furniture styled along modern lines is a practical medium for the amateur craftsman, because it permits the use of the cheaper, soft woods, and will conceal simple glued joints employing nails or screws for reinforcement. The cork is obtainable in sheets from art supply stores or as gasket cork from automobile parts suppliers. The extruded type exhibits an interesting, granular "grain," and comes in rolls 36 in. wide up to 30 ft. long. The ⅛-in. thickness is the more practicable, and should receive at least two coats of shellac before it is handled extensively, to protect it from dirt and grease, which are almost impossible to remove from the virgin cork surface.

Cork sheeting ⅛ in. thick must be cut with a very sharp knife or razor blade that will cleanly sever the granules, instead of tearing them out. It can be applied to the shellacked wood carcass with linoleum paste, temporary tacks being used to hold it in place where necessary, during the drying process. It is best to cut cork "veneering" oversize and trim it when it has dried in place. Further shellacking followed by a light sanding will provide an interesting finish.

INLAYS

Under the patronage of Louis Quartorze, the Grand Monarch, André Charles Boulle brought the ancient art of marquetry, or inlaying, to its highest perfection. Today, in spite of modern mass production methods, inlaying still remains essentially a handicraft, facilitated to some extent by the use of power tools.

Inlay Borders. Narrow borders or bands of inlays ⅛ to 1 in. wide in a hundred or more patterns can be secured from veneer supply houses in yard-long lengths. These are fabricated from pressed "sandwiches" of various layers of veneer about 10 in. wide and 36 in. long that are sawed into slices 1/20 in. thick, thus affording an allowance for sanding when they are applied around or between sections of standard veneer 1/28 in. thick.

To apply veneer borders to solid stock, dadoes can be cut along the traced pattern in a drill press with a single- or double-flute router bit of the same diameter as the width of the banding; or a rotary hand tool can be guided along a raised straightedge. To avoid tearing the wood it is customary to cut across the grain first, with a drill speed of not less than 5000 r.p.m. The depth of the cut should be slightly less than the thickness of the border to permit sanding after it has

been glued into position. Corners can be cleaned out sharply with a chisel. Figure 6.24 shows some examples of popular inlaid border corners.

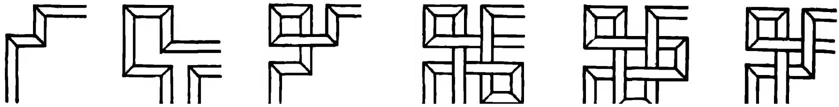


FIG. 6.24. Examples of typical border designs.

In fitting the border into its groove, sections should be selected that will match when the corners are mitered. Moderate curves can be inlaid with banding that does not exceed ¼ in. in width. Fairly sharp curves can often be fitted by heating the inlay banding, or by wetting it and separating the outer strips so that they can slide past each other as they are pressed into their curved recess.

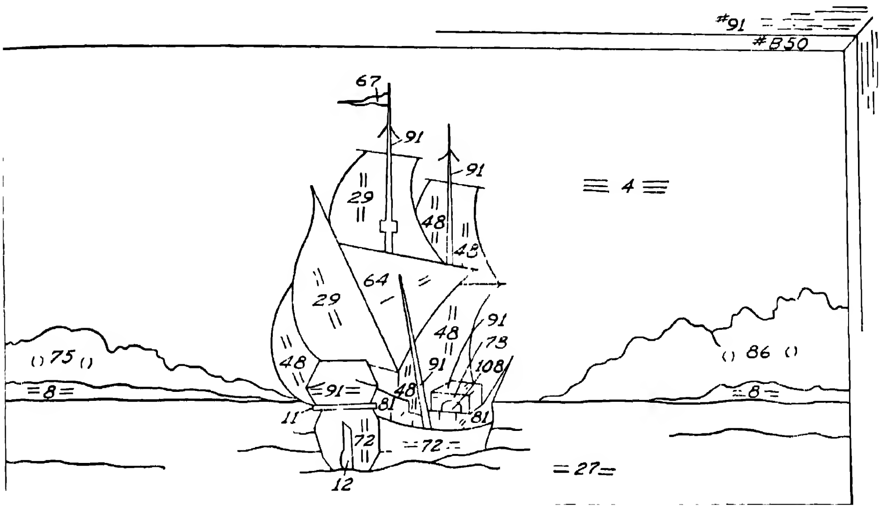
Inlays. Completely assembled inlays in various designs and colors are commercially available mounted on linen or paper backing. The linen-backed inlays are literally backed with linen, the finish side of the inlay being left exposed; paper-backed inlays are the reverse, in that the exposed or finish side is glued to the paper. The entire inlay is surrounded by a frame of inferior wood, which must be carefully cut away.

Application of these inlays to solid stock is effected in much the same manner that a border is fitted into place. The cutout inlay is placed in position with paper side up (if paper-backed), and its contour accurately traced with a lead pencil. The recess is then routed a trifle short with a rotary hand tool, or freehand in the drill press, preferably with a carving cutter. Although pressing or clamping can be obviated by using a hot glue, it will set so quickly that the inlay cannot be lifted out in case of error; therefore it is advisable to use a medium casein glue and weight or press it for about 3 hours.

Finishing. Inlays and borders should be sanded level with their backgrounds with a paper not coarser than 4/0. If the groundwork is to be stained, this should be done before the inlay is set, because there is every danger that the stain will penetrate the edges of the inlay and muddy the effect. The same is true of filler, if used; it should be natural (colorless) unless the inlay is first masked with gummed paper or a coat of shellac. Three coats of clear flat lacquer or varnish will give ample protection to the completed work.

Inlay Pictures. "Painting with wood" is no new variation of inlaying or marquetry, yet many a hobbyist has failed to interest himself in this art because he has believed that it required considerable artistic ability and an encyclopedic knowledge of domestic and imported wood colorings. With the inlay picture kits now available at veneer wood supply houses, however, complete with keyed master drawings and the necessary woods, the only artistry required is that of faithfully following traced lines with a jigsaw.

The craftsman who knows his woods can of course select his own design, fitting it to the size picture desired by means of squares, and running off a number of copies with carbon paper. Complete kits come with sufficient "pounce" copies of the master drawing. The latter not only has each section or piece numbered to correspond to the kind and type of veneer to be used, but the grain of wood indicated by horizontal, vertical or oblique lines, as in Figure 6.25.



Design copyrighted by Albert Constantine & Son, Inc

FIG. 6.25. Spanish galleon.

Formerly, inlaid pictures were assembled in a pad made up from consecutive layers of each different kind of veneer used in the picture, between backing sheets of veneer, with the design pasted to the top sheet. The entire picture was then sawed out with a very fine blade. This was not only an extremely wasteful method, but subject to costly errors, and did not permit sawing the parts of more than one picture at a time.

A more practical method, which can be used to saw up to twelve layers of 1/28-in. veneer at one time, is as follows. Beginning at a corner, or with the largest piece of numbered veneer, all pieces of the same number are cut out of one of the pounce drawings with scissors, leaving a rough margin of about 1/4 in. around each section. These sections are roughly nested together on a top "blind" consisting of a three-ply sheet or piece of 1/8-in. poplar of a convenient size dependent upon the diameter of the jigsaw table. The same process is followed with other sets of woods until the blind is full.

Tracing paper or onionskin is now laid on this pasted top blind and each group of numbers is outlined, including the grain directions. The outlines are then transferred to the proper veneers by means of carbon paper, with due

care to preserve the grain directions. The tracing can then be pasted to a bottom blind, which is the same size as the top blind. The edges of the tracing must be carefully aligned so that its lines correspond with the outlines pasted to the upper blind.

Next the veneers are cut out around the traced outline and pasted to the tracing on the bottom blind. The pad or "sandwich" can now be assembled on a piece of soft scrap wood and fine brads driven through both blinds around the outlines, into the scrap as shown in Figure 6.26. The pad is gently pried loose from the scrap base, and the ends of the brads snipped off to about ⅛ in. and clinched The veneers, protected by their two blinds, are now ready for sawing.

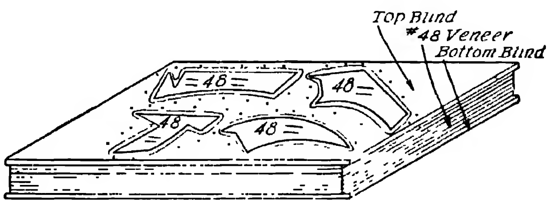


FIG. 6.26. Assembling a pad.

No special blade or tilting of the saw table is necessary, provided sufficient room between the various veneer outlines has been left so that the saw kerf can be absorbed by the waste. As a piece is cut out it should be tied to its blinds both for protection and ease in later assembly, before it is set aside.

With a copy of the master drawing as a base pattern, the cutout pieces are pasted to their respective sections like a jigsaw puzzle. Pieces that do not fit exactly can be trimmed with a sharp knife, or if necessary, cut from a new piece. After the picture has been completed it is clamped tightly between two boards with an edge projecting for jointing with a plane. When all four edges have been trued up, a piece of wrapping paper large enough to include the frame is coated with water-soluble glue or paste and smoothed onto the face of the veneer picture.

The assembly can now be laid, paper side up, upon its back panel of 7/16-in. plywood, which has been cut ½ in. oversize. A flat board caul over several thicknesses of newspaper is used under weights to insure flat drying. Once dry, the original paper pattern can be removed by sponging, if necessary, followed by pressing under paper.

When dry, the picture is turned over with its papered side face down, so that the frame and any desired strings or inlaid bands can be glued and pressed into place. When these are dry a filler of casein glue and jigsaw dust is rubbed into noticeable crevices and saw cuts. The excess is scraped off and the work again allowed to dry under mild pressure.

A medium mixture of casein glue is now applied to both the backing panel

and the bare underside of the picture and frame, and the work is placed in a press or between clamps under a paper pad and a flat board caul.

After the glue has thoroughly hardened the wrapping paper surface is removed by dampening, dried under weights and sanded, after being filled again if necessary. The backing board is trimmed to size, the edges stained black, and the surface finished with shellac, varnish, or lacquer, and waxed.

7

UPHOLSTERY AND SEAT WEAVING

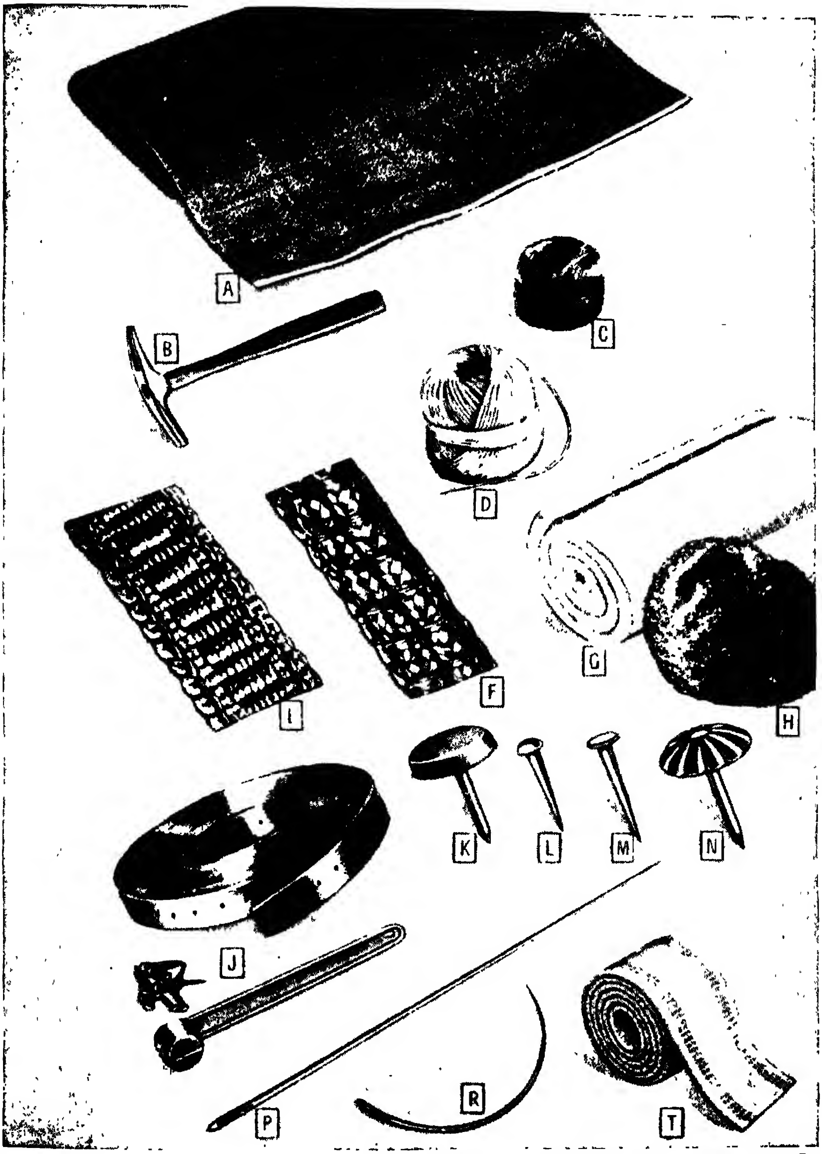
In the days of feudalism when the strength of a castle's walls was the primary consideration, the ladies of the baronial families who shivered within those cold confines early applied themselves to their needlework. The resulting tapestries not only hid the rude stone walls of the primitive rooms, but also served to diminish the continuous draughts of cold air. Skilled artisans who were proficient in hanging these draperies in a manner that insured retention of their shape came to be known and valued as "up-holders" (later upholsters).

Although that branch of upholstery that was concerned with the insertion of stuffing or springs under textiles, in order to give the outer fabric a permanent form was practiced by the Egyptians, the craft was slow to infiltrate into England and later, America. The loose "squab" cushions provided for the backs and seats of chairs during the Jacobean period were later replaced by leather, but for utility, rather than comfort. It was not until the accession of James I to the throne of England that the hard, carved furniture of that country gave way to the comforts of padded upholstery.

UPHOLSTERY

In spite of the small number of tools required in upholstering, many a home craftsman has shied away from this form of furniture-finishing because of the apparent complexity of the job. As a matter of fact, when analyzed step by step, the upholstering of an overstuffed chair or a sofa is no more complicated or difficult than any other handicraft project requiring a modicum of care and attention. One of the best means of self-instruction is to take a screwdriver and a hammer and carefully pry up the tacks, section by section, from an upholstered piece that has reached the stage where it must either be reupholstered or hidden.

A list of the various upholstering materials required for a variety of jobs appears below. The few tools required will be described as their need is encountered.



Courtesy Sears, Roebuck, and Co.

FIG. 7 1. Upholstery supplies.

(A) Cotton denim. (B) Magnetic hammer. (C) Cotton upholstery twine. (D) Hemp tying twine. (E) ½-in. flat surface gimp. (F) ½-in. extra heavy gimp. (G) Cotton padding. (H) Moss. (J) Steel webbing, tool and nails. (K) Colored metal head nails. (L) Small-headed gimp tacks. (M) Webbing tacks. (N) Antique bronze nails. (P) 8-in. straight needle. (R) 4-in. curved needle. (T) 3½-in. jute webbing.

UPHOLSTERING MATERIALS: STUFFING

Name	*Derivation*	*Resiliency*	*Breaks Easily*	*Mats Easily*	*Remarks*
Down and feathers	Ducks, geese and chickens	Excellent	No	No	Favored for cushions
Latex sponge rubber	Synthetic	Excellent	No	No	Must be ventilated
Hairflex	Rubber-coated curled hair	Excellent	No	No	Modernized hair stuffing
Curled hair	South American horses' tails and manes; hog hair; old automobile cushions	Excellent	No	No	Large proportions of hog hair augment the scarce horsehair
Kapok	Javanese bombax tree	Very good	No	No	Excellent for spring cushions
Moss	Southern U S.A.	Good	No	No	Hairlike
African (Palmetto) fiber	Shredded palm leaves	Fair	Some	No	Curled
Coir fiber	Coconut husks	Fair	Some	No	Inferior to palm leaf
Cotton batting	Cotton fibers	Fair	No	No	27 in. wide and 1 in. thick, by the roll
Tow	Flax fibers	No	No	Yes	Dirty
Excelsior	Wood parings	No	Yes	Yes	Cheapest; finest grade "woodwool"

UPHOLSTERING MATERIALS: MISCELLANEOUS

Type	*Description or Size*	*Purpose*	*Remarks*
Webbing	Jute fiber in rolls 72 ft. long, 3, 3½, and 4 in. wide	Base for springs	Favorite width 3½ in.
Burlap	8, 10, and 12 oz., 40 in wide	Covering for springs and preliminary stuffing	Purchased by the yard
Osnaburg	8, 10, and 12 oz., 40 in. wide	Substitute for burlap	
Muslin	Unbleached cotton cloth 36 in. wide	Base for final covering	Omitted in cheap furniture
Cambric	Cheap cotton cloth 24 in. wide	Tacked to seat bottoms	Black
Spring twine	No. 60 six-ply hemp	For tying springs	1-lb balls
Stitching (mattress) twine	No. 252 elm flax	For sewing burlap to springs, stuffing to burlap and for stitching edges	½-lb balls
Upholstery springs	4 to 14 in. high	Seats	Favorite height 9 in.
Pillow springs	4, 6, and 8 in. high	Arms and backs	
Cushion springs	15 × 15 in. to 22½ × 25 in. mats	Innersprings for loose cushions	Sewed in muslin or burlap units
Upholsterer's tacks	Nos. 2 to 14, with flat heads	Webbing and fabrics	Nos. 12 to 14 for webbing Nos. 4 to 10 for burlap, muslin and fabric covering
Gimp tacks	Nos. 2 to 14, with small round heads	Gimp cloth or leather	Favorite sizes, Nos. 3 and 4
Fancy nails	Various sizes and designs	Exposed	Decorative
Gimp	Narrow cloth or leather edging	For concealing raw edges of covering fabric	
Welt cord	Jute, cotton or paper	Binding for seams	Bound with covering fabric

Hassock. A simple upholstery project that will demonstrate several basic principles involves the conversion of a round cheesebox or butter tub into an attractive hassock or skirted vanity stool. A cheesebox constructed to contain a wheel of cheese has the advantage of a standard diameter of 15 in. on each end, while the average butter tub when upended presents a bottom of only 13 in. diameter. Both average some 14 in. in height, but the cheesebox will probably need to be reinforced with at least three uprights, and may require a disk of solid stock at its upper (seat) end to hold the necessary tacks. Either container should be washed with a solution of trisodium phosphate or hot soapy water and thoroughly aired to remove all odors. It may be necessary to cut the butter film with benzine or naphtha.

Rolled edge. The fundamental purpose of upholstery is to cushion the hard surfaces of a seat frame so that no sharp edges can come in contact with the occupant. A simple method for preventing this unwelcome contact is by means of a hard, tight roll of stuffing around the edges of the frame or seat to be padded. Such a roll not only softens the sharp edge it covers, but serves as a low retaining wall that prevents the displacement of the padding it surrounds.

For the hassock under discussion, a piece of 10- or 12-oz burlap is cut so that it overlaps the round hassock top by about 6 in. This is tacked closely around the upper edge of the top of the hassock frame, then rolled back and filled with cotton, or other selected stuffing to form a hard roll that will bulge about ½ in. beyond the seat all the way around, as in Figure 7.2. The roll is closed by firmly tacking the pinched-in edge of the burlap to the top of the seat.

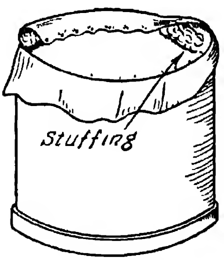


FIG. 7.2. Cheesebox hassock.

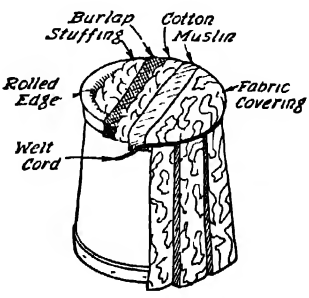


FIG. 7.3. Cross section of upholstery.

The top can now be filled with stuffing, which should be thick enough to pad out the rolled edges and form a crown in the center. This is covered by a layer of thin burlap, which is tacked down tightly over the edges to the side of the hassock. The burlap is then covered with muslin tacked in the same manner. A layer of cotton batting placed under the muslin will provide additional resiliency. A piece of the fabric cover about 24 in. in diameter can then be stretched over

the padded top and tacked down tightly over the muslin liner, directly under the rolled edge, as illustrated in the cutaway drawing in Figure 7.3

Welt. A familiar upholstery device used to conceal or embellish joints between sections of the fabric covering is known as a "welt." This is nothing more than welt cord covered with a section of the same or contrasting material, which is sewed or tacked at the seam between (in this case) the top padding and the side upholstery or skirt, as the case may be. After a piece of covering material 1¾ or 2 in. wide is folded over the welt cord and closed with a seam, the material is opened at the seam and the skirt sewed to the outer side of the lower piece, as in Figure 7.4.

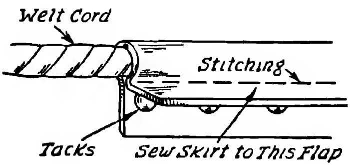


FIG. 7.4 Welt.

A pleated skirt can be cut 16 in. wide to allow for a hem at the bottom, and about 110 in. long for the 15-in. cheesebox seat. Pleats 2⅛ in. wide spaced at 1¾-in. intervals are formed before the lower edge of the welt is sewed on, and the ends left open. By turning the skirt upside down over the padded seat, the other half of the welt seam can be tacked above the tacked edges of the seat fabric so that when the skirt is lowered, right side out, all tacks will be concealed. After the pleats are adjusted, the opening in the skirt can be sewed up.

Instead of a pleated skirt, plain tailored sides can be formed in much the same manner by using a 50-in. piece of the seat fabric 15 in. long, over a layer of cotton batting around the circular side of the cheesebox or butter tub. The welt is sewed or tacked in place as before and the side fabric carefully "skinned" down to form a smooth covering. Its bottom edge is turned under and tacked to the bottom of the frame, commencing in the middle, opposite the open ends, which are stitched together when the tacking is complete, and the sides smooth and unwrinkled. A black cambric disk is cut large enough to cover the bottom, when its edges are turned under and tacked in place.

Padding a Removable Seat. The simplest form of upholstery is that of padding the board surface of a footstool. Since this operation was covered in the description of the sectional stools in Chapter 2 (page 114), it is proposed to examine a webbing job for the seat of the side chair described in the same chapter. Unless an unusually thick covering is to be applied, the dimensions of the removable chair seat frame will provide for an extra 3/16 in. all around, which should be sufficient. Before the covering operations are started, the outer edges of the frame should be beveled or chamfered to protect the fabric covering.

As indicated in Figure 7.5, the seat is springless, so the webbing can be tacked directly to the upper surface of the detachable frame. After the positions of the webbing, at suitable intervals are determined, the end of the first central longitudinal strip can be fastened in place.

Applying the webbing. The tacking and stretching of the webbing in any

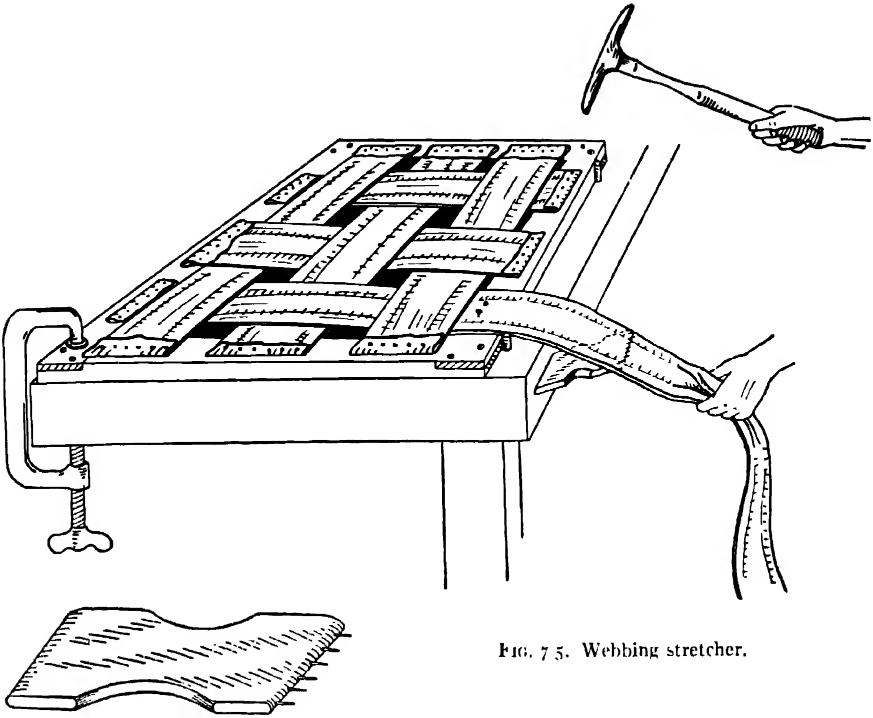


FIG. 7.5. Webbing stretcher.

upholstery project is a fundamental operation, upon whose proper application the future durability of the work will depend. The basic principle involved is that the webbing strips must be so stretched and interwoven that they will mutually compensate for single sags, while providing a stable foundation for padding or springs.

This being the case, the first consideration must be a strong anchorage for all strips at both ends; that is why each one is cut to allow for folding over at the ends. The end of a strip is attached to the frame by at least 3 tacks within approximately 1½ in. of the cut end, which is then folded over inward and fastened in place with 4 or more large tacks (depending on the width of the webbing and the softness of the wood), which are driven between the first holding tacks. The strip is then carried directly across the frame and tightened with a webbing stretcher, as in Figure 7.5. It is then tacked, cut, folded over, and fastened with as many tacks as the width will permit.

Webbing stretcher. Whittled from a piece of ¾-in. scrap 3½ in. wide by about 7 in. long, a webbing stretcher has 6 small nails driven into its working edge, filed to sharp points about 1 in. long. As illustrated, once the sharp points are engaged in the free end of the webbing, the wooden handle is wedged in place to stretch the webbing while it is being tacked down with the holding tacks. The

free end is then folded over and tacked in place to complete the strand. Once the longitudinal strands of webbing are in place, the lateral pieces are interwoven through alternate strands and fastened firmly, after being stretched. The webbing is covered with burlap in much the same manner as the webbing was applied except that no webbing stretcher is used, the burlap being tacked to the wood surface of the seat frame beyond the webbing, and folded back.

Stuffing. To prevent unwelcome contact with the chair a hard roll can be attached to the outside edge of the frame before the stuffing is put on. A layer of narrow burlap into which a roll of stuffing material has been inserted is folded back upon itself, and tacked down, as shown in Figure 7.6. If tow is used, it should be pulled out and rolled between the palms to produce an even roll about ¼ in. thick; rolled webbing can be profitably substituted. The burlap should be tacked in such a way that the first, or lower series of tackheads are even with the outside edge of the seat, to insure that the roll itself will pad the edge.

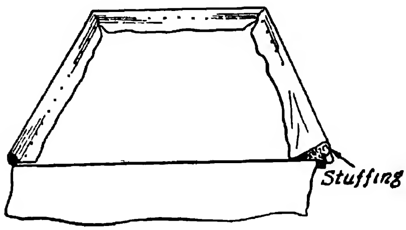


FIG. 7.6. Forming the hard roll.

After the roll is secured, sufficient stuffiing material is placed on the seat to produce a crown effect when the material is pressed down firmly with the hands. Whatever stuffing material is selected, it should be pulled out thoroughly to make it even and fluffy. It is then covered by muslin tacked to the underside of the frame. To stretch this muslin covering tightly, it is held in place by slip or loose-tacking at the center of each side, with tacks that are only partly driven in. The muslin should be turned under at the corners, and retacked after it is stretched tightly in all directions by stroking and holding as the slip-tacks are removed and replaced.

The stuffing can then be regulated or redistributed evenly by sticking an icepick through the muslin and manipulating it to remove any lumps or humps. The outer fabric is tacked to the underside of the frame, over and beyond the muslin.

A Hard Edge Spring Seat. The use of springs in upholstery has come to be expected in not only the finest pieces of upholstered work, but also the medium grades. Three types of bases may be used under the springs, and expert opinion is divided as to which is the most desirable. Wooden slats, in the early days before the front and back rails of chairs and sofas were lowered, could be utilized only with the shallower, cheaper type of springs. Enameled, cone-shaped springs used with tempered steel webbing provide a satisfactory resiliency, which lasts as long as the anchoring tacks or nails. Manufacturers of stout, interlaced webbing bases that employ deep, double cone-shaped coils, claim that this type of construction affords greater comfort. As an easy transition from the removable seat

described in the preceding paragraphs, it is next intended to examine the operation of installing springs in a seat equipped with a webbing base (Figure 7.7).

The webbing is attached to the underside of a wooden frame, which can be of varying depth. The spacing between the webbing strands, however, must be adjusted so that each spring can be centered upon the lap formed by the crossing of the longitudinal and lateral webbing strips. A frame with inside dimensions of 18 in. by 24 in., for example, can house only six springs 4 to 5 in. in diameter. Therefore, in order to center the springs on the crosswise laps of webbing which is 4 in. wide, the two longitudinal strands must be spaced 3½ in. apart with their outer edges 3¼ in. from the inside edges of the long sides of the wooden seat frame. The three lateral strands can be spaced at equal distance of 3 in. The folded ends of all strips are fastened with as many tacks as the webbing and framework will accommodate.

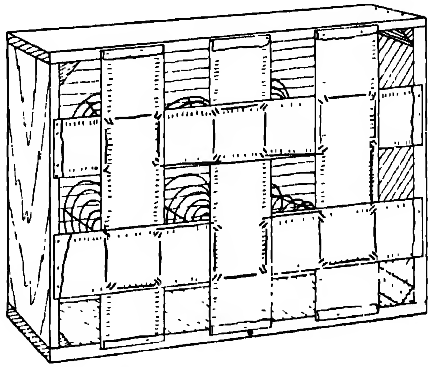


FIG. 7.7. Spring stitching.

The springs are placed in position with the bent-down ends uppermost, in order to protect the stuffing. They are then sewed to the webbing laps with stitching twine by means of a 6-in. straight, double-pointed upholsterer's needle. The stitching is commenced from the bottom, goes through the webbing, over the bottom of the spring and back to complete four double loops, the last pair nearest the next spring as in Figure 7.7. The stitches should be small in order to prevent undue wear, and the twine knotted, preferably after the last one of each pair of stitches, and certainly after the last of each of the four pairs, to prevent the loosening of all six springs if one stitch should break. When the base consists of wooden cleats, large staples can be driven in to fasten the spring bottoms.

Tying the springs. After the stability afforded by the base, the most important factor in this type of upholstery is that of the proper tying of the springs. The hempen twine not only holds the springs in an upright position, but also provides a solid support for the burlap covering, which in turn supports the stuffing. For this reason each spring is tied with a minimum of eight knots in four directions. Expert tiers employ their own time- and labor-saving methods and reduce the number of separate pieces of twine to a minimum. The amateur upholsterer, however, will do well to estimate the amount of twine required by means of a rough rule of thumb, such as multiplying the total dimensions of the frame by 1⅔, afterwards cutting the individual pieces for lateral, longitudinal, and diagonal tying, with a minimum allowance of at least 18 in. at each end for "return ties."

In tying built-in springs it is customary to commence operations from the rear.

Disregarding individual professional whimsies, the easiest method for the beginner who is faced with tying six springs in a removable base 3 to 4 in. deep is to work from the top of all but the outermost springs. The twine is laid across the tops of the three longitudinal springs, for example, with the ends thrust through the centers of the two external springs. One end is knotted approximately 18 in. from its free end to a tack driven into the edge of the frame next to the spring.

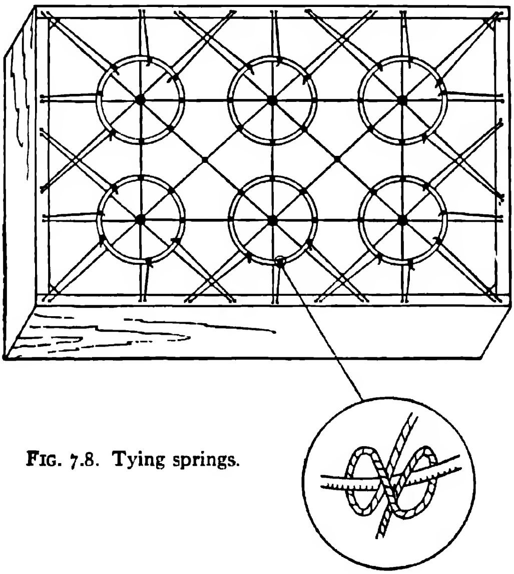


FIG. 7.8. Tying springs.

A secondary reason for tying springs is to keep them compressed to about two thirds of their expanded height so that the spring action will be limited by, and fall entirely upon, the tying cord. Therefore the spring nearest the tacked end of the twine should be depressed to a height of about 7 in., with its outer rim compressed to 6 in. before it is fastened to the twine by means of a clove hitch (Figure 7.8). The long free end of the twine is then hitched or knotted across the top of the spring to the opposite side, then across to the middle spring, where it is tied with two hitches in such a manner that the tops of the springs are spaced the same distance apart as are their sewed bottoms. The end of the twine is looped around a tack driven into the frame on the opposite side of the frame from the first tack, and the twine tightened to compress the springs properly before the tack is driven home. A second tack can be added for extra security.

As indicated in Figure 7.9, the return ties consist of knots to the outside edges that hold them down to a 6-in. height. If more than 18 in. of twine has been allowed, the cord can be carried on over the tops of the springs, being knotted at each opportunity: the more the spaces in or around the springs can be filled

with firm twine, the better will be the control of the springs and the support for the stuffing.

Lateral ties are added in the same manner, as shown in Figure 7.9 followed by diagonal ties in both directions. The last twine crossing the spring centers should be knotted to all other twines to prevent wear. In addition, wherever twines cross each other, they should be knotted. Care must be exercised that successive tyings do not compress individual springs, or rows of springs, lower than others.

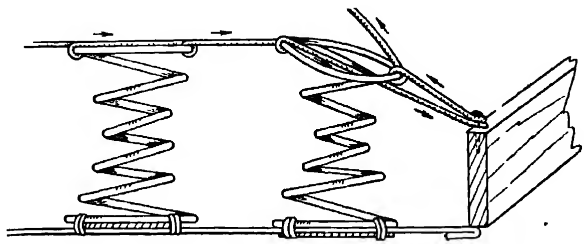


FIG. 7.9. Fastening outside springs.

Covering the springs. To cover the springs burlap is tacked to the wooden frame along folded edges. It is pulled just tight enough to prevent depressing the springs. To keep it in position it should be sewed to the springs with large stitches by means of a 6-in. curved upholstery needle, each spring being looped in three places.

Forming the hard edge. If tow is used as stuffing, about 5 lb. should be worked down so that it extends at least 3 in. over the edges of the seat frame. Whatever the type of stuffing used, it should be at least 1 in. thick and extend over the edges far enough to compress into a fairly hard roll of 3- to 4-in. diameter. The stuffing is covered with a piece of light burlap large enough to be slip-tacked onto the frame while it is being stitched through the stuffing to the lower burlap covering. A straight needle is thrust up and down through both layers of burlap, making stitches about 3 in. long just outside the outer springs. After the four sides are sewed and the stitches are pulled tight, a few irregular stitches are taken in the center, to compact the seat.

To make the roll, the slip-tacks are removed and the burlap permanently retacked higher up on the frame, so that it can be rolled under the stuffing, which extends out over the frame. The tacking should be started in the center of all four sides, be worked toward the corners, which can be thinned out if they become too full.

The actual process of forming the roll edge consists of a series of stitches that gradually lift and compress the roll as the stitching gets closer together. Whether a straight or curved needle is used depends upon personal preference; it is inserted at a left-hand corner, for example, about 1½ in. above the row of

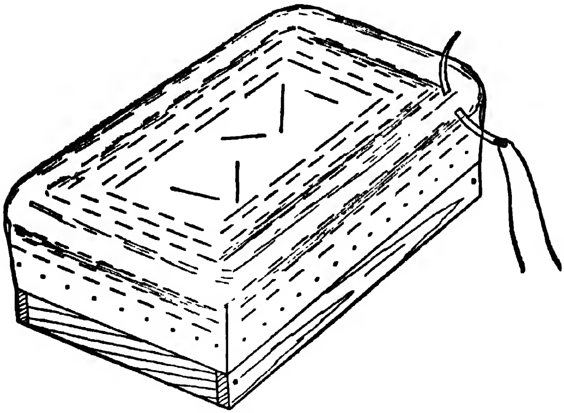


Fig. 7.10. Stitching a hard edge.

tacks, and pushed under the roll to emerge about 1 in. inside the row of stitching that holds the two burlap layers together. The needle is then reinserted from 1 to 1½ in. to the right and returned, so as to emerge to the right of its point of initial entrance at the front. Many workers content themselves with looping the twine over the point of the needle before it is pulled through this second stich, in order to lock it; others prefer to tie a slip knot. In any event, the twine must be pulled tight as the stitching proceeds around the four sides at even

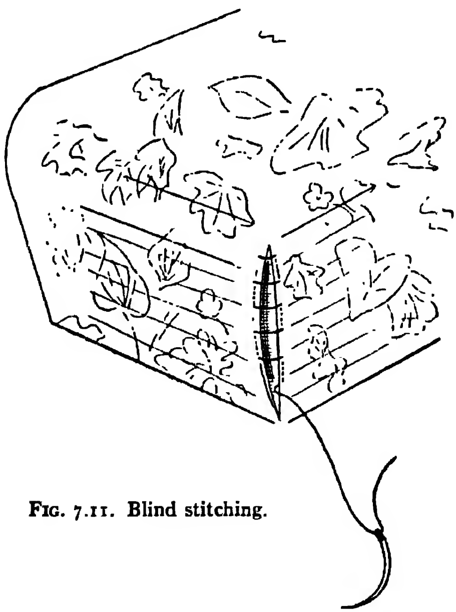
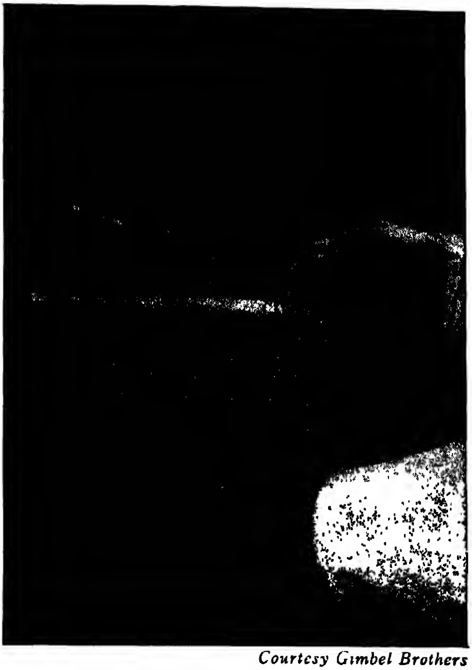


Fig. 7.11. Blind stitching.

intervals. As the work progresses the filling should be regulated, when necessary, with the icepick.

As illustrated in Figure 7.10, a second row of stitches is sewed about ½ in. inside the first row, followed by a third row and if necessary, a fourth row, until the roll has been lifted and compacted to about a ¾-in. diameter.



Courtesy Gimbel Brothers

FIG. 7.12. Blind-stitching the back of a chair.

Double stuffing. After the hard-edge roll has been stitched, a second layer of stuffing, such as moss or curled hair, is fluffed out and evenly distributed over the burlap covering to such an extent that when it is pressed down by the palm of the hand the springs cannot be felt. Over this a layer of thin burlap is tacked in place and the stuffing regulated if necessary. Long, irregular stitches through the burlap will prevent this second layer of stuffing from shifting.

Final padding. A layer of cotton batting with its edges feathered out so that they will blend with the contour is covered with muslin tacked to the frame. Since this is the last layer under the outer fabric, it should be smoothed down carefully to prevent lumps or irregularities.

Cheaper grades of furniture omit one or more of the operations described in the preceeding paragraphs. A careful worker can often achieve highly satisfactory results with thicker stuffing and fewer layers of burlap. If time and expense are

limiting factors, the amateur upholsterer can dispense with such operations as the situation demands.

Fabric covering. The final fabric is applied much as the muslin liner except that it is tacked under the lower edges of the frame, and folded carefully so that it can be "blind-stitched" at the corners. Blind stitching is employed in upholstery wherever hand sewing must be concealed. With the knotted end of the thread hidden inside the lap or seam, the basic stitch is a simple one of medium size which runs parallel to the seam, alternating on opposite sides (see Figures 7.11 and 7.12). Starting at the top on the right-hand side, for example, the needle is thrust down parallel to the lap for about ½ in., and when it is pulled out it is inserted directly across to the material on the opposite side, where it is thrust down for another parallel stitch, and so on. When edges are turned in and the thread is pulled tightly the seam will be closed and the stitching invisible.

A Spring Edge. Large pieces of upholstered furniture whose edges are subject to considerable wear employ what is known as a spring or wire edge around the front and sides of their spring seats. The spring-edge (or No. 8 galvanized) wire is carefully bent to fit the three *outside* edges of the wooden frame, with the free ends bent downward to protect the stuffing. The springs are fastened to their base as previously described. The wire-edge upper frame is fastened to the outer edges of the outside springs with windings of stitching twine, or with special metal clips that can be closed with pliers.

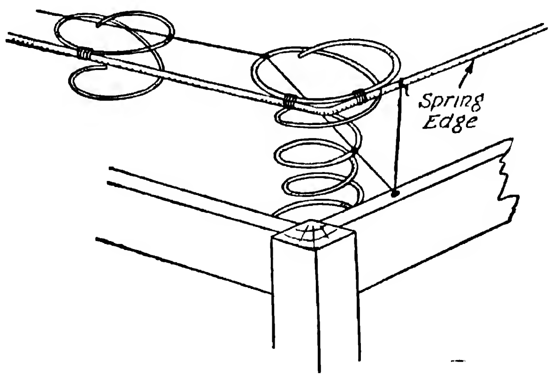


Fig. 7.13. Tying a spring edge.

In this type of edge the rims of the top coils of the outer springs overhang the wooden frame so that they are flush with its outer edges. To retain this position they must remain horizontal, thus necessitating a slight variation in the final tying operation. As will be noticed in Figure 7.13, the twine is brought down through the center of an outside spring as before, but is tied to a second or third outer loop of the spring (depending upon its height) before it is looped

around a tack in the frame. It is then carried up and tied to the outer spring edge as a brace, without the wire-bound edge being lowered. In large upholstered pieces the tying cord is often dropped through the center of the next to the outer spring and knotted to its second coil, then carried across and knotted to the third coil of the outer spring in a long diagonal to its anchoring tack. In spring-edge tying, care must be exercised that all springs are maintained at an equal height, including the wired edges of the outer rows of springs.

Stitched edge. Burlap is sewed to the springs and tacked tightly to the frame as before, without compression. A layer of stuffing is then covered with a piece of burlap that laps the previous piece by a good 6 or 8 in. This is sewed to the lower burlap through the stuffing about 3 in. from the wire edge. Instead of this second layer being tacked, a roll of stuffing 3 to 4 in. in diameter is tucked under its loose edge, which is then sewed to the wire edge to form a fairly hard roll. The hard edge is then formed by successive stitches as previously described, followed by the same procedures in covering.

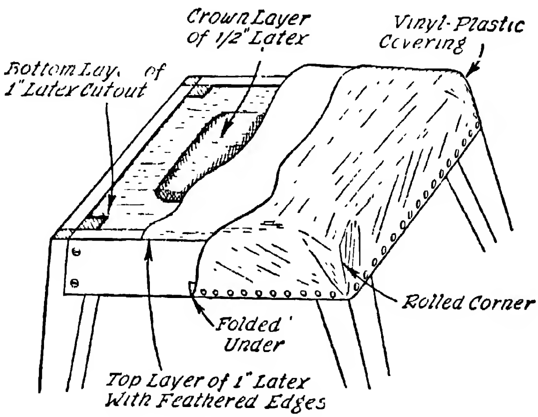


FIG. 7.14a. A sponge rubber stool top

Sponge Rubber. Sponge rubber is a popular modern padding that is easily applied. For the bathroom stool described in Chapter 2 (page 170), a piece of ¾-in. plywood set on cleats within the recess formed by the rails serves as the base, ventilated by a series of holes, staggered so as not to weaken the plywood.

The 1-in. thick Latex spong rubber is easily cut with scissors, the cardboard template that served as a guide in cutting the plywood base being used. It is good practice to tack in a layer of burlap before the first layer of rubber is inserted. To give a crown to the seat, a smaller slab can be sliced about ½ in. thick and its edges feathered with the scissors. This is fastened to the center of the lower slab with rubber cement, then a top slab, also 1 in. thick and ½ in. larger

than the top of the frame, can be cemented in place. After the cement has dried the top slab should be trimmed to fit, and its edges rounded with the scissors.

Vinyl-plastic materials such as Koroseal come with a fabric backing suitable for application to the stool top, directly over the rubber. Since these materials should not be stretched too tightly, plenty of width must be allowed on all four sides, the edges being slip-tacked under the lower edges of the rails during the fitting.

For final tacking, the edges are folded under ½ in. and upholstery tacks are driven in at regular intervals about ⅛ in. from the fold, as shown in Figure 7.14. If a nonmarring, plastic hammer is not available as in *b*, adhesive tape can be stretched across the hammer head to protect the upholstery nails. The corners of the fabric are rolled rather than sharply folded, to prevent wear.

Courtesy Stanley Tools

Fig. 7.14*b*. Plastic hammer.

Upholstering Loose Cushions. The maple arm chair described in Chapter 3 (page 111) makes use of the popular loose cushions as upholstery for its seat and back. Although cushions of this type containing only down, cotton, or kapok will give good service, the inclusion of an innerspring mat will insure greater comfort at slight additional cost. These spring mats are procurable from an upholsterer in sizes varying from 15 in. by 15 in. to 22½ in. by 25 in. and are not difficult of insertion.

Casings. Cushion casings can be machine-sewed from a top and bottom piece attached with welting to a one-piece side band or border. After the over-all size of the cushion has been determined and the proper sized spring mat procured (2 in. being allowed for the cotton batting covering on the top, bottom, and sides), the top and bottom pieces of the cushion casing are cut, with an allowance of ½ in. all around for the seams. The width of the band should include an allowance of 1 in. on either side for the welt cord and seams.

The welt cord can be sewed to the casing edges on a sewing machine equipped with a standard half foot. The simple method indicated in Figure 7.15 is broken down into three separate steps, for clarification. The

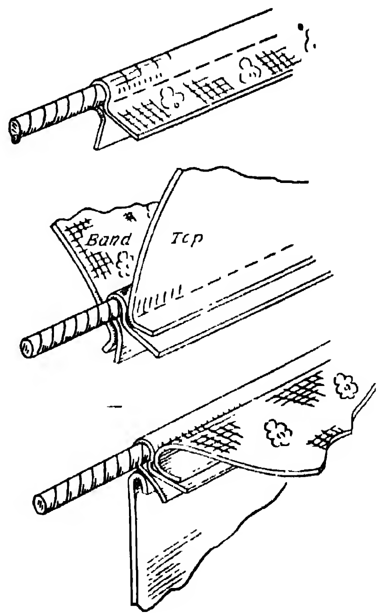


Fig. 7.15. Attaching welt cord to cushion edge.

piece of outer fabric used to cover the ⅛-in. welt cord need be no wider than 1½ in., and can be sewed in one operation to the top and the band of the casing, square corners being made. The French seam preferred by some workers requires a second seam and is not illutrated. The back of the casing is left open for filling.

Stuffing box. Variously known as a cushion filler or loading, ramming, or packing box, the stuffiing box is a simple jig usually made of sheet metal for production work. A satisfactory box for home upholstery, however, can be easily assembled from corrugated cardboard, as illustrated in Figure 7.16; the wooden ram or ramrod will prove of value for the final stuffing operation. The outside dimensions of the box must be such that it will slide snugly into the finished casing; the over lapping edges are bradded to the top of the workbench, then pried up and clinched.

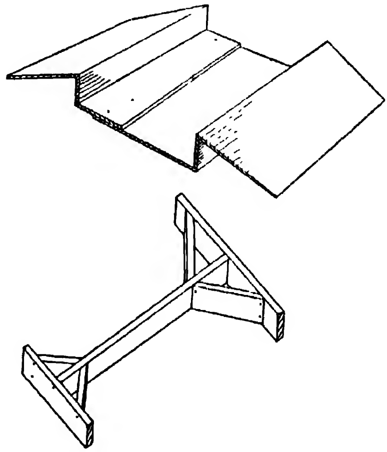


Fig. 7.16. Stuffing box and ram.

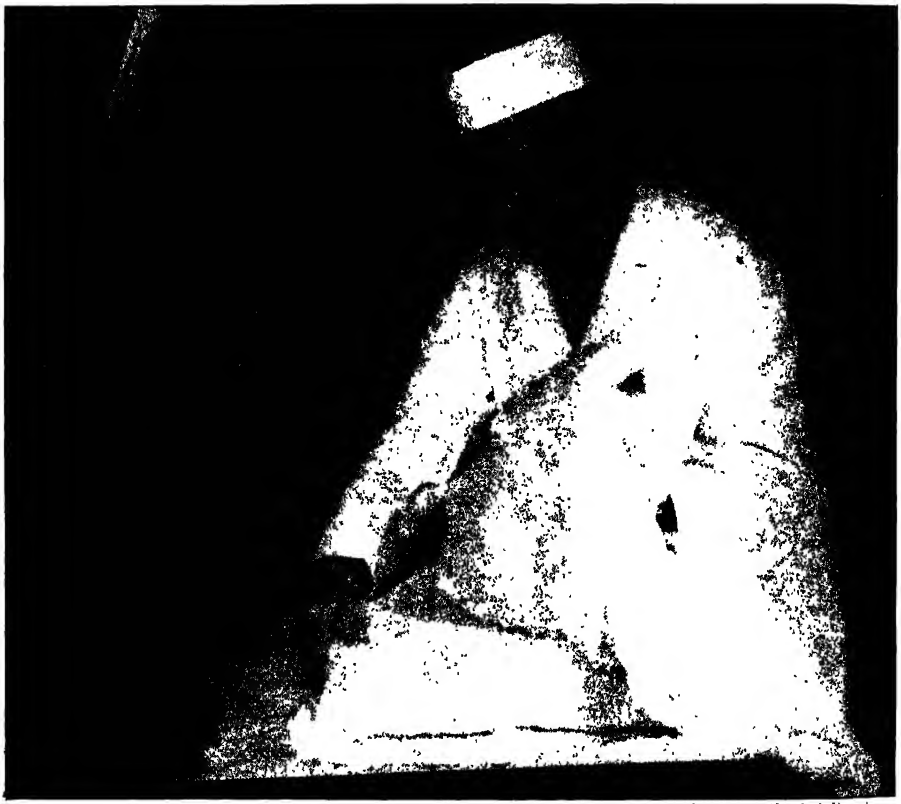
Covering the springs. Two layers of cotton batting should be sufficient to cover the springs. One layer is placed in the loading box and the spring mat laid upon it and wrapped in the cotton wadding, which has ends protruding far enough so that they can be tucked in. The second layer is laid over the lap in the first layer and tucked around and under. The box can now be tied or sealed shut with gummed paper, and the loose edges of cotton batting tucked in smoothly, feathering where necessary to produce square edges.

Filling the casing. To insert the padded innersprings into the casing, the latter is stripped on over the closed box and contents, and its rear ends grasped in both hands as pictured in Figure 7.18. The ram is inserted inside the box against the padding, with the opposite end butted against the operator's stomach. A gentle, continuous pressure will push the pad and casing out of the cardboard box. The open rear end of the casing can then be closed by hand sewing.

Channeled Backs. A favorite method of applying upholstery to the concave surfaces of chair backs is by means of a series of radiating, tubular channels or folds which hold the stuffing vertically, as in Figure 7.19A. This method is particularly appropriate for the barrel chair described in Chapter 3 (page 232), where the back is concave in two directions. This is another complicated appearing upholstery device that when analyzed step by step is seen to require only simple sewing or tacking techniques.

The first step is to divide the chair back with chalk into vertical sectors that radiate bisymmetrically from the center. Next, the muslin liner and the fabric covering are cut into as many pieces as there are folds or channels to be stuffed,

3 in. extra in width being allowed for the stuffing, and sufficient length for tacking at the bottom as well as for lapping over the top and tacking to the back of the chair back. The two end channels are cut wide enough to reach around the ends of the arms for tacking to the sides of the frame. Since all the pieces are to be sewed together, ½ in. must be allowed for each seam, in addition to the 3 in. for stuffing.



Courtesy Gimbel Brothers

FIG. 7.17. Covering cushion springs with cotton in a metal stuffing box.

In an upholstered chair, the muslin liner can be sewed to the chalk lines, starting with the middle channel. When both sides of the latter are stitched in place, the bottom can be tacked and the filling tamped down and regulated with an icepick (see page 382). Adjacent seams are sewed and alternate channels filled until the end folds are filled, stretched around the fronts of the arms, and tacked to the frames. The top edge can now be stretched down over the top edge of the frame and tacked to the back. If a muslin liner is being used, pieces with their

edges folded under are tacked to the outside of the arms and over the back. The fabric cover is applied over the muslin in the same manner, except that it is blind-stitched at the back and on the outer sides of the arms.

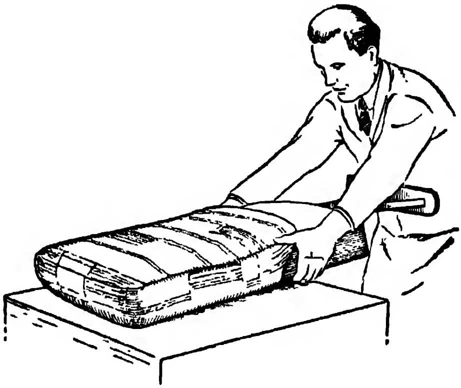


FIG. 7.18. Filling the casing.

When the wooden-backed barrel chair is being covered, the same procedure is followed, except that the channels are tacked directly to the staves. With a close-woven fabric covering, the muslin liner may be omitted, provided the stitches or tacks are closely placed, as in detail B of the drawing.

Tufted upholstery. Another method of securing padding to a vertical surface is by means of fabric-covered tacks, geometrically sewed or tacked to give the padded surface a quilted effect. This is an especially popular effect in the head-

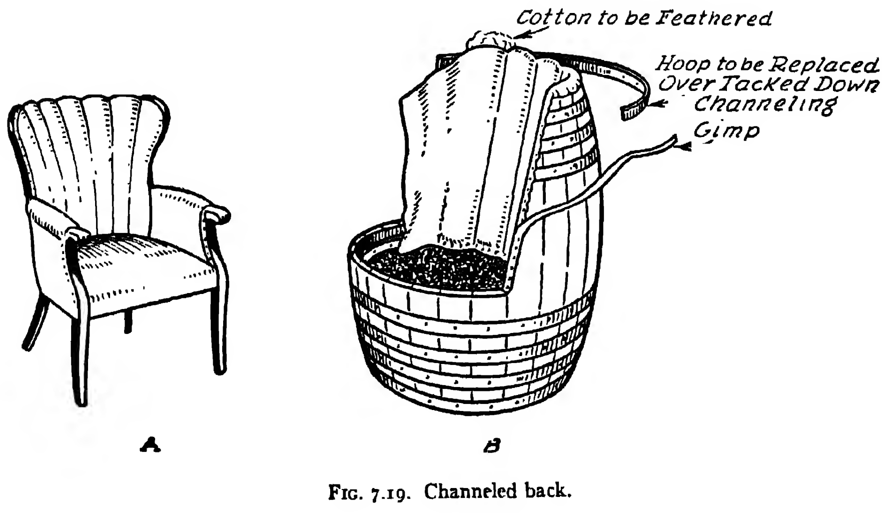


FIG. 7.19. Channeled back.

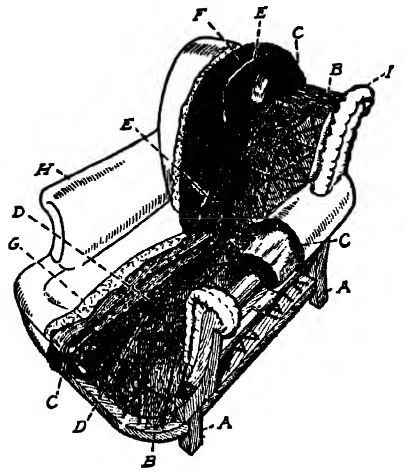


FIG. 7.20.

boards of Hollywood beds and requires no particular technique other than a carefully measured layout or pattern.

Notes on the Upholstery of Large pieces. An analysis of any large piece of upholstered furniture will reveal that its padded covering is the result of a systematic application of the basic principles discussed in the preceding paragraphs. The amateur upholsterer who is able to turn out a satisfactorily covered spring seat can with patience and foresight successfully upholster the spring back and padded arms of an "overstuffed" chair or sofa.

This can be proved to the reader's satisfaction by an examination of the upholstered chair shown in the cutaway illustration in Figure 7.20. The wooden framework is indicated by (*A*); the webbing base by (*B*); (*C*) is the curled hair stuffing; (*D*) the tempered steel springs tied with eight stout twines in the 8-knot tie, and covered with burlap (*E*); the second layer of stuffing (*F*) is sewed to the burlap and in turn covered by a layer of cotton (*G*); (*H*) is the outer fabric covering. If muslin liner (*I*) is added over the cotton layer before the outer fabric is applied, it will be readily apparent that the fundamental procedures in upholstering an overstuffed chair are no different from those employed in the assembly of a removable spring seat.

Normally, home upholstering projects will be limited to repairs and recovering operations. Under these circumstances it is important that the old covering be carefully removed so that it can be used as a pattern for cutting the new material. For estimating the amount of unfigured material required, the following table will serve as a rough rule of thumb:

Courtesy Gimbel Brothers

FIG. 7.21. Removal of old covering.

Approximate Table of Fabric Coverings (Without Designs)

Type of Furniture	*Number of cushions*	*50 to 54 in fabric*
Armchair (seat only)	None	⅞ yd
Boudoir chair	None	2½ yd
Boudoir chair	1	3 yd
Wing chair	None	4 yd
Wing chair	1	5 yd
Club chair	None	4 yd
Club chair	1	5 yd
Loveseat	None	6¼ yd
Loveseat	2	7½ yd
Couch (60 to 84 in.)	None	7 yd
Couch (69 to 84 in.)	3	9½ yd

Most domestic covering fabrics come 50 in. wide, with a few at 54 in.; some imported fabrics are woven in 36 in. widths. For fabrics with large designs as much as 3 yd must be added to allow for matching the individual figures.

Fabric coverings. The table on the following page lists and describes some of the popular fabric coverings:

Replacing webbing. Under ordinary use and care damage to upholstered furniture will first be manifested by sagging seat springs, as the result of loose or worn-out webbing. Sometimes only one or two strips will have come loose and can be refastened, but usually the failure of a few strands is indicative of the need for replacement of the entire webbing base, particularly if its resiliency has dried out through age. The cambric dust covering should be unfastened on three sides to facilitate a thorough examination.

It will of course be necessary to cut away the loops of twine that bind the bottoms of the springs to the crossed webbing. If the entire webbing base is to be removed, this will afford an opportunity for examining the cord ties, which should be replaced if broken. If a longer webbing stretcher is used and the piece under repair propped bottom side up, the webbing can be stretched by footpower, leaving both hands free (Figure 7.22). Longer nails must be used in replacing webbing, unless each tack can be so placed as to avoid old holes. Cement or rosin-coated shingle nails are a useful size for this type of work.

In order to avoid the removal of the webbing and the many loops of twine, if the springs have not burst apart from their tying cords, it is often possible to reinforce them permanently by stretching and nailing steel strapping over each fabric webbing strip, and lacing each metal strand in the same manner as the webbing was attached. As shown in (J) of Figure 7.1, the steel strapping is sold with an iron stretcher that levers each strand taut as it is being nailed. Heavy tinsnips will cut off the required sections of strapping.

FABRIC COVERINGS

Fabric	*Description*
Printed linens	Hand-blocked or machine-printed
Cretonnes	Unglazed, printed cotton fabrics
Chintzes	Of finer texture and more tightly woven than cretonne. Glazed chintz has stiff, varnishlike finish; semiglazed chintz is softer
Toiles de Jouy	Hand-blocked linen or cotton replicas of early French designs
Warp (shadow) prints	Woven from plain or mercerized cotton yarns upon which the design was printed prior to weaving; also woven from silk, linen or rayon
Damask	Design woven into base yarn of silk, rayon, cotton, wool, linen, mohair or metallic thread or combinations
Brocade	Woven pattern is superimposed, in relief, on cotton, damask, satin, taffeta, and other weaves
Brocatelle	Usually a silk ground with a cotton filling in a heavy, cross-ribbed effect. May be of silk, cotton or wool
Armures	A small raised pattern with a pebbled or embossed effect
Rep	A corded or ribbed effect
Denim	A cotton fabric showing a twilled weave
Tapestry	A fabric into which has been woven a design whose perspective has been created by the manipulation of contrasting colors
Velvet, velours	Silk, cotton, rayon, linen, ramie, or wool fibers or pile that stand upright above the ground fabric. May be woven or shorn into patterns
Plush	Of longer pile than velvet, mohair plush is more satisfactory than silk, cotton, or wool plush
Frieze	Frizzed or curled plush
Satin	A sleek, smooth, and lustrous silk weaving in which either the filling or the warp covers the surface completely
Sateen	Woven the same as satin, except from cotton
Embroidery	Originally a handicraft, they are usually produced by machine
Crewel work	Replicas of sixteenth to eighteenth century English embroidery with colored yarns on a plain linen ground
Needlepoint	"Petit point" consists of fine stitches through one opening in the canvas ground to the next
Leather	Rugged, durable, and sanitary; favored in masculine clubs
Imitation leather	Less durable than genuine leather
Vynol-plastic materials	Being water-repellent, these fabric-backed materials are superseding imitation leather as their fabrication improves with experience

Seats and backs. In most chairs and sofas the springs are not removable and, as previously stated, are tied from rear to front, after the webbing base has been repaired or replaced. Otherwise, when necessary to replace or renew the stuffing, the procedure is the same as for a removable spring seat (page 383). When removable springs cushions are used, they should be covered as soon as the seat has been completed, in order to determine the amount of stuffing that will be required for the back and arms, which must be filled out to touch the cushions.

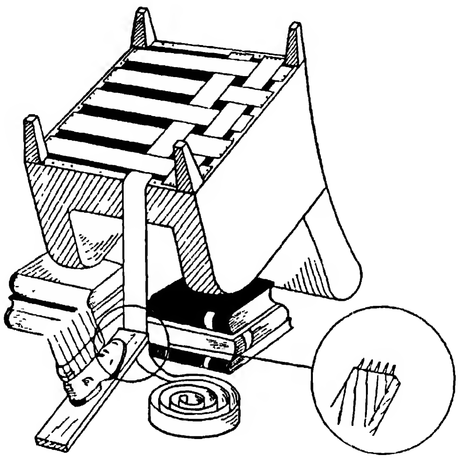


FIG 7.22 Foot-power webbing stretcher.

A spring back is tied in the same manner as a spring seat (page 382), except that diagonal ties are omitted. The burlap, muslin, and fabric coverings are pulled down behind the seat and through the aperture behind the lowest member of the back frame, so that it can be tacked to its bottom edge, or to the back of the back rail, as the case may be. Once anchored, the material can be pulled up smooth and tacked to the front of the upper frame for a rolled edge, or to the rear for a final covering.

Top and bottom front bands. Depending upon the style of framework, several relatively slight variations in the application of the top and bottom front bands may be encountered. In general, the top front band consists of a piece of covering fabric the width of the seat, and long enough to extend from a line at least 4 in. to the rear of the front spring edge and down over the front to where it can either be tacked above the exposed bottom rail and covered with gimp, or sewed to the welt cord of the bottom front band as in Figure 7.23. In either case its rear edge is first sewed to a piece of undercover material such as denim, sateen, or service velour that is large enough to cover the seat springs.

To fasten the top front band in position, the best practice is first to pin it

in place so that the design will match the cushion. It can then be stitched with a curved needle through the burlap, being caught under the springs wherever possible. A layer of cotton is placed under the band and feathered off by gently tearing it even with the front edge. If the band is not to be tacked and gimped above a finished bottom rail, it can be stretched down and tacked under the concealed rail, if desired, thus eliminating a bottom band.

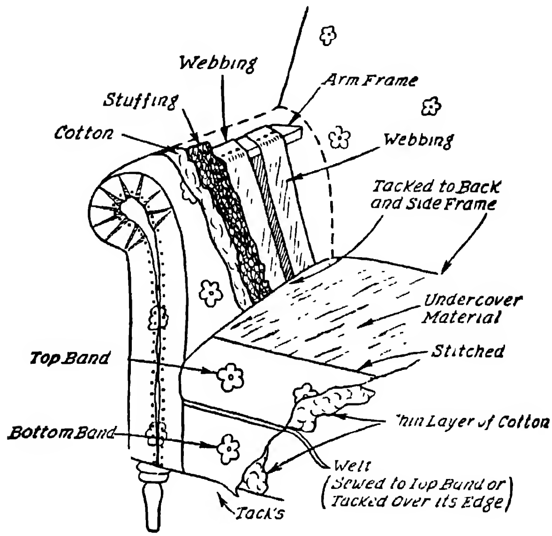


FIG. 7 23. Attaching top and bottom bands.

To attach the bottom band to the top band, a welt cord is sewed to the top edge of the bottom band, then tacked down above the tacks holding the lower edge of the top band. The chair or couch is then turned upside down and a thin layer of cotton laid across under the bottom band (optional). The latter is then stretched smoothly down and tacked underneath the bottom rail. Another method is to hand-stitch the bottom of the top band just beneath the roll of the spring edge, and attach the bottom band with a welt at this point.

It is assumed that the burlap spring covering has been properly padded with stuffing stitched to the burlap, which has in turn been covered with the usual layer of cotton and muslin. It should be remembered that when covering a seat that is the base for a removable cushion or cushions, its top should always be lower than the front edge, so that the underside of the cushion will not be visible. The undercovering can now be pulled back smoothly and tacked to the back and side rails of the seat, without compressing the springs.

The arms. Webbing is usually tacked from the side rails to the inside of the arm frames to reinforce the burlap lining that provides a base for the side stuffing.

As previously mentioned, the thickness of the latter is determined by the size of the seat cushions, which it touches. Therefore the double stuffing with its burlap covering and final layer of cotton and muslin is applied with the cushion in place to insure proper thickness. In furniture with wide flat arms, similar to the chair illustrated in Figure 7.20 or 7.23, the edges of the arms should be built up with roll edges as shown. The muslin and fabric covering can be forced down past the seat and tacked to the side rail, then carried smoothly up the inside and over the top, and tacked under the outside arm roll. With a figured fabric covering it is good practice to slip-tack the bottom edge first, to permit adjustment of the pattern.

The fabric covering is stretched from front to rear by first tacking the top to the front post, then pulling the material tightly to the rear and tacking it to the back post. As the tacking proceeds, the padding on top of the arm should be molded to a comfortable contour by patting it with the palm of the hand, from front to rear. With a rounded front post the material is pleated as the tacking progresses around the curve (see Figure 7.24). In order to protect the front post panels, it is customary to apply them after the back covering is in place.

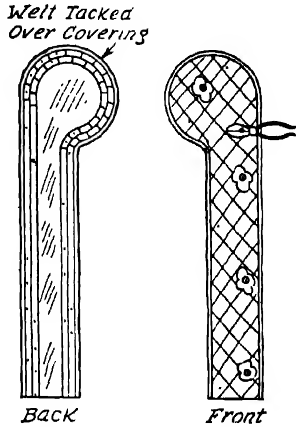


FIG. 7.24. Front post panels.

The back. With the cushion still in place, the piece of furniture is turned over on its back so that the inside of the back can be covered in the same manner as was the spring seat. Although some upholsterers omit diagonal tying in the back, there is no reason why it should not be applied to the back springs. The dictum that "whatever is worth doing at all is worth doing well" is most applicable to upholstery, where once the fabric covering is in place no further tinkering is possible.

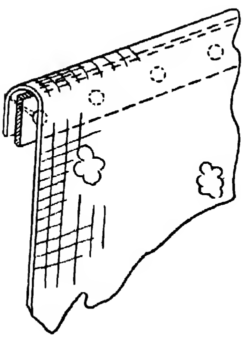


FIG. 7.25. Concealing tacked edge.

The covering of the back is carried out as if it were a spring seat, except that more filling is required, so that like the arms it will bulge out over the back rail to touch the cushion. In a sofa or loveseat, the back fabric cover may be divided into as many sections as there are cushions, with welt cord sewed between the panels. The material is tacked in the same manner as for the arms, at the bottom first, then stretched evenly over the cotton-padded top and back posts, to which it is tacked in the rear.

Outside arm covers. To insure a straight edge for the tops of the outside arm covers, they can be tacked underneath a cardboard strip directly below the arm, as shown in Figure 7.25. Stuffing or cotton may be added under

a deep arm, if desired, although it is often omitted, and the material drawn down and tacked under the bottom rails. The front edges are tacked alternately to the front, then to the back, posts to stretch the material smoothly.

Courtesy Gimbel Brothers

FIG. 7.26. Tacking on the outside back.

Outside back. The outside back can be attached with brads, tacks covered by gimp, or by blind stitching, as preferred. The bottom edge is tacked under the bottom rail.

Front post panels. The best way to conceal the tacked pleats on a curved front post is to cut out a pattern from ⅛-in. plywood and tack a properly matched piece of the fabric covering to its back. A welt cord tacked around the edge as a binder will present a finished appearance to the job. The panel can be nailed in place with brads that are long enough so that their heads can be snipped off before they are driven home, as in Figure 7.24.

Partial Recovering. The fabric covering on the tops of the arms of overstuffed furniture is likely to receive the most abuse and to wear out first. It is often possible to cut the threads or remove the tacks holding the outside back, so that it can be removed and used as replacement material for the worn arms. A plain fabric of the same general color can be used to replace the outside back-piece, where it will probably remain unnoticed, particularly if the chair or sofa is located against a wall. The same procedure can be followed in the case of a worn-out or badly stained cushion.

SEAT WEAVING

Caning. The hand weaving of caned seats, backs, and other parts of furniture is rather a tedious process, involving the boring of a series of evenly spaced holes around the frame of the opening. The actual caning operation requires six weaving steps, plus the application of a binder. The cane, which is imported from India, Ceylon, China, the Indian Archipeligo and the Malay Peninsula, is soaked in warm water before it is used, and must be kept tightly strung throughout the weaving, by means of removable pegs thrust through the holes.

Although the popularity of caning as a decorative effect declined sharply at the turn of the century, many households retain examples of handsome caned pieces. Nowadays the repair of seats which were formerly hand-caned has become a relatively simple operation through the use of machine-woven cane webbing. Procurable in various widths and lengths, the webbing can be chosen in plain or diagonal weaves, open or close woven.

Replacing Cane Webbing. Machine-woven cane webbing is anchored to the seat or back of a piece of furniture by a spline glued into a groove that parallels the opening. Its replacement is not difficult provided the spline is carefully removed by softening the glue with water. Assuming that a satisfactory gluing job was originally performed, and the spline remains solidly in place regardless of broken strands of cane, it will probably be necessary to cut a V groove in the top of the spline to retain the water, which should be allowed to remain there overnight, (see Figure 7.27). Naturally the seat or chair back must be blocked up so that the grooved spline is in a horizontal position. The water should be renewed if necessary, for it should not be allowed to dry out until the glue has softened. One end of each segment of the spline can then be prized out with an icepick or other sharp-pointed tool, in order to release the old webbing.

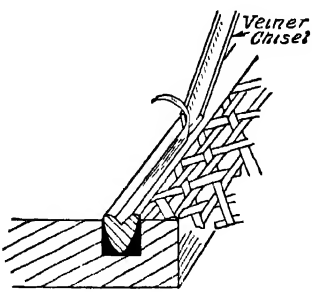


Fig. 7.27. Cutting groove in spline.

Prefabricated webbing comes in rolls of indefinite length, 8 to 12 in. wide. The new piece of webbing should be soaked in warm water until thoroughly pliable, so that when it shrinks in position it will dry out drum tight. A paper pattern aids in cutting the new piece of webbing, so that its front edge will be parallel with the horizontal line of the mesh. A hardwood wedge, a heavy bent wire, or the back of a curved upholstery needle can be used to press the flexible edges of the webbing into the groove. The ragged edges of the cane can then be cut off with a chisel and mallet, or trimmed off with a sharp knife after the spline is in place.

Wedge-shaped hickory splines are obtainable from the same sources as the webbing. Unless the opening is round, or the corners of the groove are curved,

the four splines should be carefully measured and mitered at the corners to insure a snug, neat fit. Liquid glue will give the amateur more time to apply the splines and tap them into place. Although the glue may be run into the groove and its webbing, less spattering will occur if it is applied directly to the splines.

The spline along the front edge is inserted first and tapped into position with a plastic-faced mallet, or a wooden wedge to prevent marring; then the rear is splined, to draw the webbing taut, after which the side splines are installed. For a rounded groove the spline should be first soaked in hot water until it can be bent.

Rush Weaving. The renewal of interest in Early American and Colonial furniture and accessories has automatically revived the craft of rush weaving. The use of woven rushes for the seats of stools and chairs in England after 1720, as a utilitarian, rather than as a decorative measure, was adopted by Colonial cabinetmakers. That it has since been employed harmoniously in modern furniture is but proof of its functionalistic appeal.

Rush. Chairmaker's rush is twisted from water-loving plants, such as flags and cattails. Gathered in the middle of August as the leaf tips begin to turn brown, the leaves are tied in loose bundles and dried in a darkened room. Before being used, they are soaked in warm water for eight or ten hours, and the stiff butt ends cut off from the base. One, two, or three leaves are then twisted in one direction to form long, smooth strands for weaving.

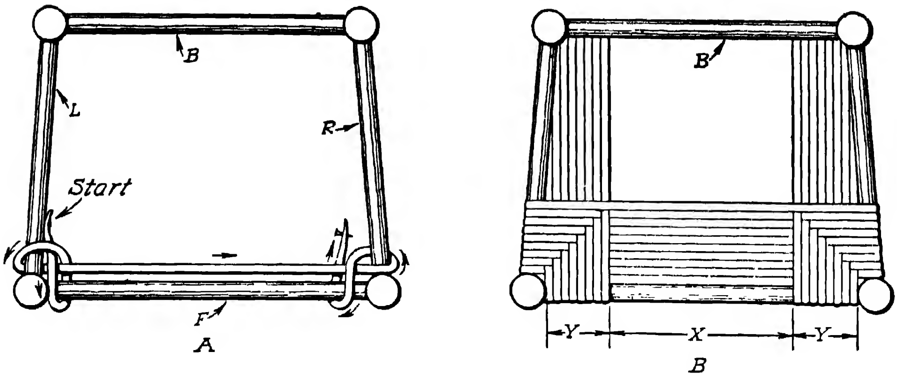
A very satisfactory substitute for the genuine rush is manufactured from machine-twisted paper in the form of an art fiber cord. Obtainable in various sizes and colors, it is an excellent medium for the amateur chairweaver because it comes in continuous lengths, either in 1-lb cartons or 25-lb rolls. A pound of the 3/16-in. size will measure approximately 280 ft. For the ladder-back or Mexican side-chair seat described in Chapter 2 (pp. 108-9), about 3 lb will be required.

Another excellent material for rush weaving is Hong Kong marsh grass. This is also twisted into continuous hanks weighing from 3 to 4 lb, up to 3/16-in. diameter.

Weaving technique. Rush weaving is a simple operation requiring no special tools. If art fiber cord is used, little or no splicing will be required; if necessary it can be knotted under the seat, or neatly spliced by flattening the two ends and gluing the overlap together, the splice being secured with a tight wrapping of thread. For easy handling, the endless cord can be wound upon a short length of ½- or ¼-in. dowel, or looped and held together with rubber bands.

Since modern chair seats are seldom constructed in a rectangular shape, the weaving of a standard flare-front seat of the type described in Chapter 2 (page 108), will be described step by step. Once mastered, it is a simple matter to apply the final weaving operations to any square or rectangular stool, should the need arise.

As indicated in Step One, Figure 7.28, the initial "weaving" consists of short windings around the front corners to reduce the irregular opening to a rectangle. The beginner can accurately mark off a width on the front rail equal to back rail (*B*) by placing a framing square against the front rail so that the blade will

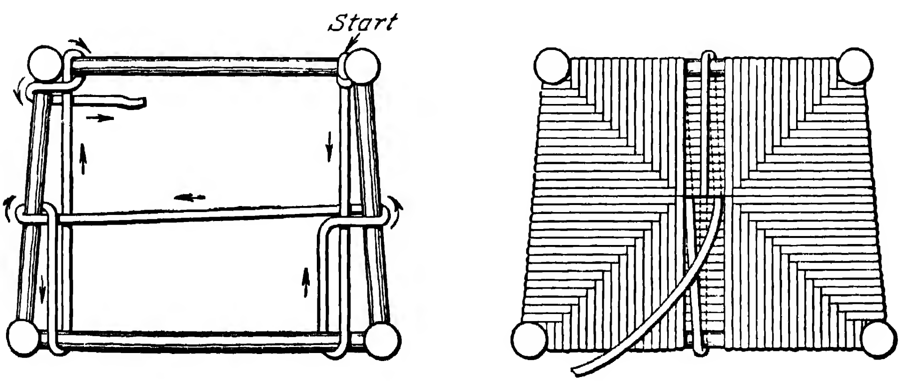


Step One

FIG. 7.28 Rush weaving.

butt against the inner edge of the corner of the back rail. By dividing the remaining distances by the thickness of the fiber cord, in this case 3/16 in., the number of short strands required to fill in the flare can be determined in advance. As shown in A of Step One, the ends of the first strand and all succeeding strands are tacked to the inside of the left-hand side rail (*L*) a short distance from the front, then wound over and under front rail (*F*), and carried over and under side rail (*L*). These loops should be pulled tight and pushed firmly against the left chair leg before the cord is brought across to the right-hand rail (*R*). Here it is looped over and under side rail (*R*), then above the horizontal strand and over and under the front rail (*F*), before it is pulled taut, cut off, and tacked to the inside of (*R*) at the same distance that its starting end was tacked to (*L*).

As illustrated in B of Step One, this procedure is followed with succeeding



Step Two

Step Three

FIG. 7.29. Rush weaving.

strands of fiber until the last strand reaches the marks on the front rail parallel to the back rail (*B*).

For illustrative purposes, the short strands shown in Step One have been omitted in Step Two, Figure 7.29. Step Two, as shown in the sketch, consists of a rectangular weaving of a continuous piece of cord in the same manner in which the short lengths are wrapped. Commencing at either rear corner, the right rear in this case, the cord can be tacked under or knotted around the back rail (*B*) and brought down and over the front rail (*F*), then over and under side rail (*R*), and so on. By examining the diagrams it will be obvious that the basic technique of rush seat weaving is nothing more than an over-and-under winding of the chair rails at each corner, in succession. Analysis of the drawings in Figures 7.28 and 7.29 will show that the cord always leaves a rail from underneath and passes over the top of the next rail, whether right or left. Thus, when properly woven, all cords will be either parallel or at right angles to an imaginary center line.

Rarely does the weaver encounter a perfect square. Step Three, also shown in Figure 7.29, illustrates the method to be followed when the short rails have been filled with cord. This is simply a matter of passing the remaining cord over and under each long rail in turn, bringing the free end of the cord out through the center of the weaving each time, alternating over and under, as shown.

In order to give fullness to the seat, it may be padded with newspaper cut into narrow strips which are thrust under the bottom layer of the three layers of cord. To do this the chair should be turned upside down, and the paper forced into place with a screwdriver or whittled stick. A better procedure is to apply light stuffing between the upper and lower layers as the weaving progresses. Care must be exercised not to break the strands, or reduce the elasticity of the woven seat by overstuffing.

Finish. For protective purposes, the porous art fiber cord is usually given a sizing of hot glue thin enough to be applied with a brush. When thoroughly dry, the sizing provides an excellent base for one or more coats of white shellac or clear varnish. Some weavers omit the glue sizing, using at least two coats of a good, elastic varnish. Hong Kong grass requires no sizing; the shellac or varnish coats on seats woven of this material can also be omitted if desired.

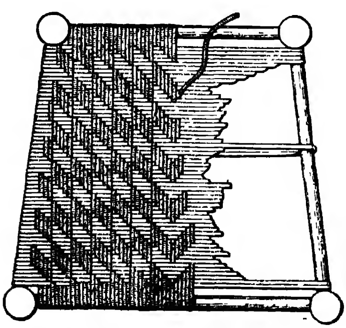


FIG. 7.30. Diagonal design.

Variations in Design. The type of Mexican chair described in Chapter 2 (page 110) often has a woven seat of a simple diagonal design. The familiar rafia of basketwork offers an interesting medium for this primitive furniture, particularly if a contrasting color is employed for the diagonal insertions. Since the rafia comes in lengths varying from 2 to 5 ft., it must be frequently spliced or knotted.

underneath the seat. Furthermore it should not be loosened from its hanks, only one strand at a time being pulled loose as needed, to prevent tangling.

As will be noted in Figure 7.30, this method of weaving is far from complicated. The first step consists of tacking one end snugly against the corner of a side rail, then wrapping in a continuous strand around both rails horizontally, until both are completely covered without any overlaps, the remaining end being tacked underneath. The second weaving step may make use of red or green rafia, if desired. The front rail is marked off in a segment that is equal in length to the back rail, as previously explained, and one end of the rafia is tacked to the underside at this point. After the rafia has been drawn through the fingers to remove all twists, it is brought up and over the front rail and the first five horizontal top strands, where it is pushed down through the upper layer. It is then carried under the top layer for five more strands, threaded through and pulled up over for five more strands, and so on. The bottom layer of horizontal strands is woven in like manner. When skill is acquired, the next strand can be knotted or spliced to the underside, where it will be unnoticed; otherwise the next strand can be tacked underneath and woven in the same manner, except that it is "threaded" or pushed through the horizontal layer, one strand nearer to the front, emerging one strand closer to form a diagonal, as the vertical strands increase in number up to five. This diagonal weave can be continued clear across the seat, or can be reversed at midpoint to form the bisymmetrical pattern illustrated. In this case the best practice is to begin at the center and work outwards, to insure an even design.

The use of flat fiber cord will greatly simplify the layout of more ambitious, geometrical designs. By selecting a cord ¼ in. wide, it is a relatively simple matter to transfer the seat dimensions to graph paper, and by plotting four widths of cord to the inch, to work out an interesting original pattern. With the flat cord constant care must be exercised to prevent twisting or overlapping. Both flat and round art fiber cord are obtainable in various colors.

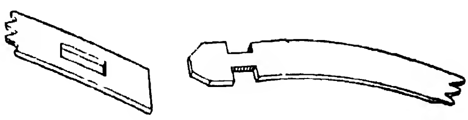


FIG 7.31. Splicing splints.

Splint Weaving. If the ladder-back chair described in Chapter 2 (page 108) is constructed from hickory, it requires a complementary "splint-bottom" seat. Composed of hickory splints ½ in. wide and 1/16 in. thick, which can be woven in a variety of designs, these seats when properly constructed are nearly as everlasting as the frame. Sometimes known as "Indian splints," hickory splints 8 to 10 ft. long are usually sold in coils weighing about ¾ lb. They must be soaked in water for several minutes before being used, to insure maximum pliability.

The actual weaving is similar to that of the rafia seat described in preceding paragraphs, except that the individual strand is ½ in. wide and much stiffer to handle. Graph paper remains an excellent means for plotting the design and position of the splints. Some designers prefer to experiment with black and white paper strips cut ½ in. wide. Because hickory splints are prone to split, the best method of fastening a free end to the chair rail, or of splicing, is to use a cheap metal stapler procurable at most 5-and-10 cent stores. Figure 7.31 shows a more laborious method of splicing, cut with a chisel or sharp knife. Experienced weavers overlap spliced ends for a considerable distance under cross strands.

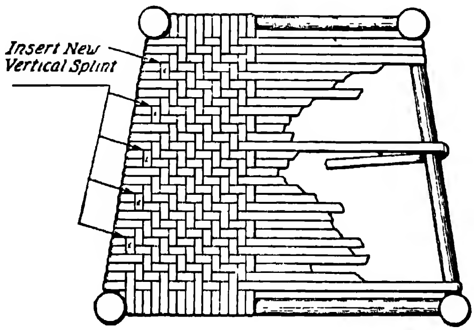


FIG. 7.32. Splint weaving.

Weaving technique. In an interesting variation of the popular diamond weave, the side rails are continuously wrapped with parallel, spliced splints as in the rafia seat. As shown in Figure 7.32, the front-to-back "weavers" are inserted in the following order:

1st splint—under 2, over 2, under 2, over 2, etc.
2nd splint—under 1, over 2, under 2, over 2, etc.
3rd splint—over 2, under 2, over 2, under 2, etc.
4th splint—over 1, under 2, over 2, under 2, etc.
5th splint—under 2, over 2, under 2 over 2, etc.
6th splint—under 1, over 2, under 2, over 2, etc.
7th splint—over 2, under 2, over 2, under 2, etc.
8th splint—over 1, under 2, over 2, under 2, etc.

The underside is woven in identical fashion to insure maximum strength. Successful seat patterns often start from the center instead of an edge of the frame, forming a radial pattern toward the four corners. Careful measurements and patient plotting will be rewarded by a satisfyingly complete pattern. Splints do not require a finishing agent, although oil or varnish may be applied with discretion.

8

RESTORATION, REPAIR, AND REFINISHING

RESTORATION

THE principle of how much and what to restore must be an early decision. After an owner who does his own restoration work has taken apart and reassembled several pieces of historically old furniture, he becomes strongly impressed with the soundness and honesty of old workmanship and materials, and more and more disinclined to make any but the most necessary additions or repairs.

In general, the oldest pieces will be in need of the most repairs, therefore, as Rule I we may accept the dictum that the greater the rarity of the piece of furniture, the greater the permissible restoration. This, however, brings up the question of losses of a ½ in. or more through wear and tear. In the case of an old item that is in good condition except for a slight loss in height, the owner is likely to feel that it would be a mistake to remove the piece from the class of *all original* to that of *restored,* merely for the sake of adding an additional inch or so, unless the loss of some vital part of a gracefully turned foot, for example, detracts from the general symmetry.

The more one studies and handles really old furniture, the more one becomes imbued with the spirit of the history it represents. The outward and visible signs of such a history, which may have taken as long as two hundred years to write, are the evidences of age and long usage—the nicks and scratches, burns and stains, loose pins and even carved initials. Hence for Rule II it may be stated that in good restoration work we seldom find a table top that has been planed down or "skinned" to restore each tiny break, every lost splinter, or all rusty tack holes.

Although various woods were employed in the construction of single pieces of early furniture, the end result was a systematic, balanced mixture. For example, a table might exhibit maple legs and oak stretchers, but almost invariably all the legs were of maple and all the stretchers of oak, with the entire apron of pine.

In a lowboy or highboy all drawer fronts were of the same wood, and in a desk the right side was made of the same wood as the left side, unless a paint finish was intended. For Rule III, therefore, we must decide to match the wood of the corresponding part of the piece under restoration. Furthermore, to avoid tedious and unsatisfactory attempts to match the finish of the unrestored parts, the wood used for the new parts should be old, unless its mating parts must also be replaced.

The last and most important rule is axiomatic, yet the one most often violated. For Rule IV it can be simply stated that no "improvements" in style are permissible. When the repair is so extensive that no patterns are available from which to model the new work, simplicity should be the keynote.

Sources of Old Wood. Old buildings and discarded furniture are potential sources for the old wood so useful in restoration work. More specifically, a really old house will often yield oak boards from its floors, hand-hewn timbers, wide pine boards from floors, ceilings, or walls, and in some cases, sections of undamaged panels and moldings. Hand-forged nails and rough greenish window glass are also valuable by-products of careful house wrecking. Even dilapidated old barns, upon investigation, often reveal their quota of hand-hewn beams, wide boards, and homemade nails.

Other sources for old pine and oak, as well as for tulipwood, are the discarded "six-board" chests. Kitchen tables of fifty years ago can usually be relied upon for worn pine or tulipwood tops. Drawer sides and backs, and sometimes fronts, can often be salvaged from wrecked chests of drawers, bureaus, and sideboards.

Old maple for small turnings is fairly difficult to obtain, unless found in the side rails, and sometimes the ends, of old beds. Ash is another scarce item, some times found in rake handles, more often in the large, turned posts of spinning wheels. The rims of large spinning wheels are usually constructed from curved ash or oak, which can be converted into chair splats without further bending.

Tables constructed between 1840 and 1850 frequently yield fine boards of cherry, while black walnut is readily available from Victorian furniture. Old mahogany veneer is fairly easy to acquire.

From these brief notes it should be readily apparent that the search for old woods involves a certain amount of persistent reconnaissance. Dogged burrowing into the depths of secondhand furniture shops eventually rewards the patient searcher, often at bargain prices, and attending country auctions often pays off in unexpected treasures—in addition to affording a liberal education in furniture craftsmanship.

Veneer. The earliest American Chippendale, Hepplewhite, and Sheraton chairs, ball-and-claw foot tables, lowboys, and highboys were constructed from solid "Santo Domingo" mahogany. Later, large, flat, top, and front surfaces were veneered, the legs and frames still being assembled from solid wood. Nearly all American veneer was applied to a foundation of pine, whereas in England oak was the popular base wood. In 1700 walnut veneer was used in slices 1/10 in. thick, and by 1850, mahogany veneer was sometimes produced as thin as 1/50 in.

If the veneer is in such bad condition that repairs will produce a patchwork appearance, it is best to remove the entire surface and replace it. When this becomes necessary it should be remembered that glue adheres better to wood than to glue; therefore all old glue should be removed by soaking it with water, followed by a gentle scraping and sanding, if necessary. In the event that suitable presses or clamps are not available, sandbags, clothes boilers filled with water, or piles of bricks can be used to good advantage.

Very small breaks and gashes can be filled by "burning in" stick shellac. Similar in appearance to sealing wax, stick shellac is obtainable at paint stores in a variety of colors. It not only looks like sealing wax but must also be melted like wax when used. For average-size repairs, the shellac is melted with a soldering iron or an old screwdriver that has been heated, care being taken not to char the cement with too much heat. When the depression has been filled slightly more than flush with the surrounding surface, it is let harden after a moistened finger has been pressed upon it as quickly as possible; it can then be smoothed down flush with a spatula or nail file that has been heated over an alcohol burner, or in any other way that will not deposit soot on the blade. In order to avoid damage to the surrounding finish, an alternate method is to pare down the shellac patch with a razor blade. Once hard, the glaze of the patch can be removed by rubbing with rottenstone and oil. If a single stick of shellac will not provide the right color, cement from different sticks can be blended.

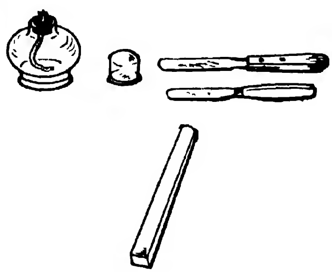


FIG. 8.1. Patching materials and equipment.

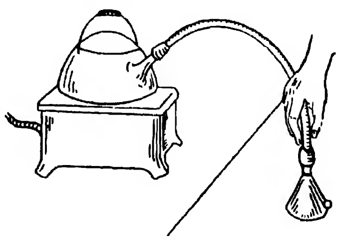


FIG. 8.2. Steaming blistered veneer.

Blisters are common disfigurations in old veneer, and if small and unbroken can often be reduced by the application of a hot flatiron over a damp cloth. If the blister is broken, it is probable that dirt has collected underneath, and must be removed by an icepick or an orange stick before the top can be flattened and glued down. Large blisters usually require opening, with two side cuts and one across the grain to form a flap. Since old veneer is invariably brittle, it is better to steam it into pliability than to cut it in its dry state. A simple "steamer" can be assembled from a length of rubber shower hose that is forced over the spout of a teakettle, with its other end enclosing the spout of a small funnel (Figure 8.2).

As steam emerges, the open end of the funnel is placed over the blister until the veneer becomes limber. Once the blister has been opened, a drop or two of glue is introduced and the flap pushed down and clamped or weighted; too long a delay in this operation will require resteaming of the veneer. Excess glue should be wiped away, and a piece of waxed paper placed over the flap before the weight is applied.

Small holes, scars, and blemishes in veneer, as well as in solid stock, can be successfully hidden by skillfully applied diamond-shaped patches. In order to insure clean, sharp edges, the "grave" cut in the veneer, or solid member around the blemish, should not be cut at right angles to the grain. Therefore, although the patch need not be an exact diamond, it should in general conform with the shapes suggested in Figure 8.3.

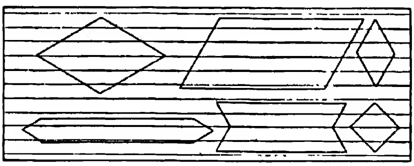


Fig. 8.3. Veneer patches.

Obviously, the grain of the patch must conform with the grain of the surrounding wood. To this end a templet of cardboard covering the patch and outlined in pencil will prove a valuable aid. Keeping carefully inside the penciled lines, the grave is then cut out with a sharp knife or a long-beveled chisel, so that the cuts slant outward from the bottom. The piece of veneer that is to be used in the patch is then laid over the veneer surface so that the grains coincide, and marked off around the templet. If the patch is to be jigsawed, the table can be tilted so that the cut edges will slant inward; the same type of cut can be made with scissors if they are sharp enough.

If the shade of the original veneer surface cannot be duplicated, a lighter wood can be used and stained to match. A careful gluing job will render such a patch almost indistinguishable. Inlays—which came into use after 1725—can be repaired in the same manner. Missing pieces of inlay can often be replaced by stick shellac of the proper color.

Pins. The pins used in early furniture were always made of hardwood such as oak, maple, beech, walnut, or cherry, and were seldom perfectly round. Usually the section to be inserted first was roughly rounded, gradually becoming rectangular or square near the head end. In this way when the pin was driven in, the corners of the head end bit into the hole to form a tight, firm joint. Pennsylvania furniture often utilized a sharply oval pin not often encountered elsewhere. The pins were soldom glued, and often projected beyond the surrounding wood.

In repairing or restoring operations that require the removal of this type of pin, the best procedure is systematically to lay aside and mark each pin in such a manner that it can be returned to its original position in its proper hole. Broken pins should be replaced with whittled and filed replicas that are as exact as possible.

Moldings. The usual types of small moldings employed in early furniture were of three simple shapes. Of the cross sections shown in Figure 8.4, the earliest is the single arch (detail A). The others are known as the double arch (detail B) and the canal mold (detail C).

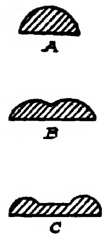


FIG. 8.4. Moldings.

Edges. A moment's thought should convince the most enthusiastic restorer that unless an old piece of furniture has been kept in a glass case the greater part of its existence, all of its edges that have been subjected to wear will show varying degrees of roundness. Yet time after time "restorations" turn up with knifelike edges at points that would have received the maximum erosion from wear. Such members as the edges and corners of table tops, the stretchers and feet of all sorts of furniture, and the finials, rungs, and arms of chairs are bound to become worn and rounded over a period of years, no matter how carefully they may have been handled.

Table Tops. Tops, of old tables, varied from a ⅝-in. to a full 1-in. thickness, with an overhang in proportion. The four common types of molded edges (shown in Figure 8.5) were molded, oval, square, and thumbnail.

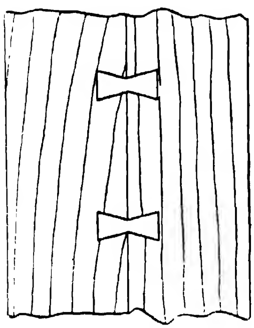


FIG. 8 6. Double butterflies.

Table-Top Joints. The boards forming old table tops were jointed in several ways:

1. Square, butt-jointed, sometimes glued
2. Tongue and groove
3. Ship lap, (uncommon)
4. Double groove and tongue in fine pieces after 1750, (spline joint)
5. Mortise and tenon, similar to the double groove and tongue, the long tenon being held in the corresponding or opposite mortises with wooden pins in very early, as well as later, furniture.
6. Doweled
7. Double butterfly made by inlaying small double wedge-shaped pieces into the under surfaces of each pair of boards, (Figure 8.6). These "butterflies" were sometimes glued, but more often bradded or pinned.

Drop-Leaf Table Hinge Joints. The three types of hinge joints common to drop-leaf tables are shown in Figure 8.7. There is still some doubt as to whether type A, the square butted joint, was used on very early tables, or only on rather unimportant models about the middle of the nineteenth century. Never a handsome joint, this type was supported by hinges mortised into the underside.

Until 1725, the tongue-and-groove joint B was found in many of the early gateleg and butterfly tables. As previously mentioned, the year 1725 saw the introduction of the rule joint C, which left no visible opening when the table leaves were lowered. The construction of this joint was explained in Chapter 3

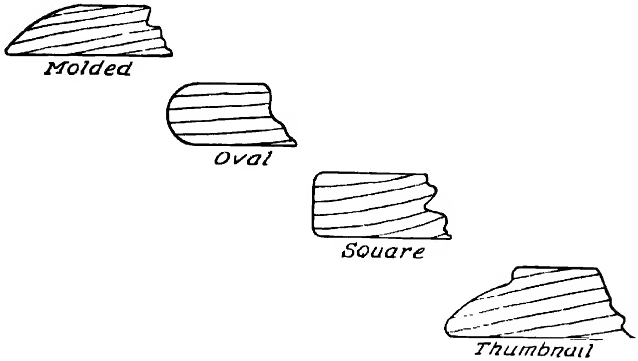


FIG. 8.5. Table edge moldings.

in connection with the butterfly table (page 97). Its supremacy has remained unimpaired up to the present day, in modern tables of this type.

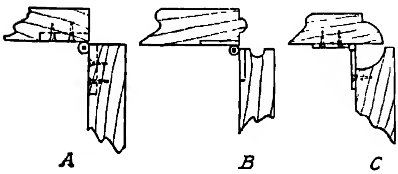


FIG. 8.7. Drop-leaf table hinge joints.

Tavern and Stretcher Tables. A most useful little table, which in its original or modified forms retains its popularity as a side, end, or lamp table in modern living rooms, is the English and Early American or Colonial tavern or stretcher table (Figure 8.8). Constructed for individual or small group use in the early taverns and inns, these tables had stretchers on all four sides where the weary traveler could rest wet or cold feet above the draughty floor.

Tops. The square, rectangular, round, oval, or octagonal tops were often formed from a single board stiffened with a central cleat across the grain.

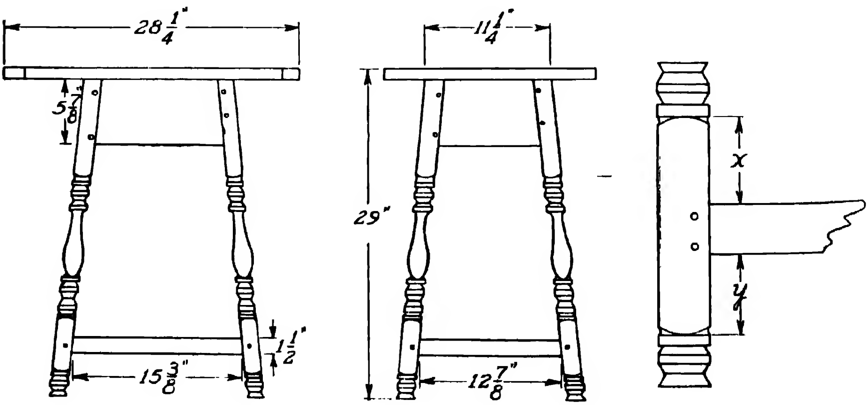


FIG. 8.8. Typical tavern table.

Larger tables with two-board tops were cleated at each end in one of four ways:

1. Doweled with wooden pins extending 3 or 4 in. into the ends of the boards.
2. Hand-forged nails through the cleats. Often the edges of the cleats became worn between these nails in a series of scallops.
3. Top ends tongued into grooves in the cleats and pinned (less common).
4. Tenons in the top ends held in mortises in the cleats with wooden pins (rare, except in Pennsylvania).

Dilapidated tavern tables will be found with tops, drawers, and feet missing. Frequently some or all of the stretchers will have been sawed out, instead of being repaired.

Symmetry. In common with all well-designed furniture, tavern tables exhibit a fundamental consistency of form. Almost invariably it will be found that when the leg of one of these tables is turned above the stretcher, it will be turned below, and frequently the turnings above are identical with those below. Another common practice was to locate the stretcher midway between the shoulders of the turnings, as in the detail of Figure 8.8. A further consistency that should be noted when replacing missing stretchers is that their outer faces should be set flush with the outer faces of the legs when the aprons or upper members of the frame are also set flush.

Drawers. Like other parts of early furniture, drawers progressed through various cycles of design and refinement.

Fronts. Very early examples were constructed so that the fronts were flush with the drawer rails and bases. Later the lipped type was adopted, followed again by flush fronts. The flush type naturally stood up to prolonged use better than the lipped fronts. When the lips of the latter broke off, they frequently carried away sections of the front surface. To repair such a break, narrow strips can be mortised into place, rabbeted, then planed and sanded flush with the front.

Sides. The very earliest drawer sides were rabbeted and nailed, or were assembled with very broad dovetailing, also nailed. As is true of modern drawers, various combinations were popular, such as the sides rabbeted and nailed to the front and only nailed to the back; or broad dovetailing nailed to the front, and rabbeted and nailed to the back.

Dovetailing grew progressively finer and narrower until by about 1800 the sides of most drawers were assembled by means of small dovetailing, at all four corners.

Bottoms. The earliest drawers had bottoms nailed to the sides. Later examples show the sides and back nailed, with the front edge tapered into a tenon fitting into a groove in the drawer front. Still later, in Hepplewhite, Sheraton, and Empire mahogany furniture, the back edge only was nailed, the other three edges being slid into grooves.

Slides. Very old rare pieces have side runs that slide in grooves cut into the drawer sides. Another unusual arrangement was a wide slat in the center. The

majority of drawers, however, operated on bottom runs or slides that were fastened to the frame at each end.

Chairs. Subjected as they are to a maximum variety and degree of strain, chairs of any age will inevitably become damaged. A few of the common chair problems encountered in restoration work are listed below; more extensive repairs will be discussed in the succeeding section, devoted to repair.

Slats. A minimum type of damage has occurred when one or more slats in a ladder-back chair, or splats in a bannister chair, are missing or broken. As previously mentioned, the curved segments of spinning wheels are excellent sources for slats, inasmuch as no steaming and clamping or shaping will be required. While the straight type of molded bannisters were sometimes cut from maple, softwoods such as pine or tulipwood were considered sufficiently strong because of their straight grains. In the split turned variety, however, softwoods were shunned because of the fragility in turnings of such small diameters. Ash, maple, oak, or other strong woods should be used to make a full turning exactly coinciding in pattern with the turnings of the back posts, then ripped lengthwise. For small diameter work it is preferable to rip the stock before turning, gluing it together with waxed paper between the halves, with the rough ends bradded or screwed.

Legs. In general, in old chairs the bottoms of the rear legs will display plain, turned sections, while those of the front will usually conform to the pattern of the front posts.

Feet. When feet are missing or so damaged that they must be replaced, the best method is to turn the roughed-out foot with a pin of ¼-in. diameter, or larger, for gluing into a corresponding hole in the leg, (Figure 8.9), rather than to resort to doweling. Restored finials should be attached in the same manner.

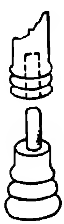


FIG. 8.9. Restoring damaged foot.

In restoring feet on Dutch or Spanish chairs it is customary to shape the piece roughly, then to glue its pin into place in the leg and let it set, before working the foot into its final shape with rasps and files. Where a section of the leg has been carried away in the splitting off of a foot, it can often be "halved on" with glue, clamped, then reinforced with small screws to prevent later loosening.

Windsor chairs. Because the construction of fine Windsor chairs embodied adroit use of the different shrinkage rates in green and seasoned woods, the restoration or repairing of this type of chair is not ordinarily an easy operation. The able craftsmen of those early days succeeded in combining some of the strongest and most elastic of native woods into a slender, graceful, and sound harmony of line and form.

The one-piece seats of white wood, basswood, or tulipwood, together with the maple legs, were usually cut from green or unseasoned wood, whereas the maple stretchers, the bent bows or hoops, and the spindles of hickory, oak or ash, were formed from well-seasoned wood. The ends of the stretchers were left slightly oversize, so that when they were driven into their holes they were held tightly

by the shrinkage of the green legs. It is probable that it was after the legs had been permitted to dry that they were set with the wedges, which were always driven in at right angles to the grain to prevent splitting, as the pressure increased.

The Metropolitan Museum of Art

FIG. 8.10. Windsor side chair, end brace, T. Timpson 18th Century, maple, hickory, pôplar as ash.

An interesting locking device was employed in some wedges, by cutting them wider at one end, at an acute angle (Figure 8.11), in order to force the wedge laterally, so that the sharp corner anchored itself into the surrounding wood.

Like the stretchers, the dry bow and spindles were held tightly in their mortise holes by the shrinkage of the green seat. Doubtless, the heavy, sawed maple arm rails were placed in position before they were seasoned; the light, bent arm rails were usually of oak, hickory, or ash. It is also reasonable to suppose that the comb was set in place while still green, and for the same reason.

FIG. 8.11. Wedge.

Severe damage to Windsor chairs is likely to occur at one or more of four sensitive points:

1. Where the ends of the bent bow join the seat.

2. Where the spindles are set into the bow.

3. The arm rail, where the mortise has been cut to receive the tenon on the end of the bow.

4. At the sharp bend in the back of the arm in the type of chair that has a one-piece arm and back.

Square breaks in Windsor chairs, as in any type of furniture, are hard to mend. One satisfactory method is to cut off each end of the break at an acute angle, so that a properly shaped filler piece can be halved in by gluing. Two or three small screws may be added for additional security. Although nails are taboo in repairing furniture, for a delicate spindle that has been broken off directly under the bow, an iron dowel can be improvised by carefully drilling a small hole from the top of the bow through the broken-off piece, and into the top of the spindle for a distance of 1 or 2 in. After a drop or two of glue is flowed in, a finishing nail the same size as the hole can be inserted, not driven, and left undisturbed until the glue has set.

Hickory is the preferred wood for the back bow or hoop. It can easily be steamed in a 6 ft. length of galvanized iron leader pipe, with a capped end that is tilted down into the fire, after the pipe has been filled with water. While the ⅞- or 1-in. spokeshaved hickory stock is steaming, a paper pattern can be cut to the size of the proposed curve, and tacked to a heavy board platform, the floor, or a wall of the workshop. Six or seven more blocks are firmly screwed to the outside of the pattern, with the seventh, topmost block inside, as shown in A of Figure 8.12, allowing a space as wide as the bow is thick. When the hickory has become sufficiently pliable, it is clamped in this bending jig and permitted to dry out thoroughly for several days. A simple bending jig for combs is illustrated in B.

Hardware. The fabrication of hardware for early furniture was a craft in itself, and a knowledge of the periods represented by the different styles is indispensable if the amateur restorer is to avoid ludicrous anachronisms.

Brasses. For the sake of authenticity, many experienced furniture restorers do not remove original brass handles or keyhole escutcheon plates during refinishing. Instead, they work around them, leaving traces of the old finish and making no effort to cover the abrasive marks left by loose handles on drawer fronts. This is especially true of the rare cotter-pin handles, which were held in place by iron wires bent at right angles and driven into the drawer backs.

When no handles or escutcheon plates remain, handmade replicas should be obtained if possible. This requires a familiarity with the styles prevalent at the time the piece was constructed to prevent such errors as Sheraton brasses on a 1700 highboy, engraved cotter-pin brasses of 1710 on a veneered mahogany Sheraton chest, or "willow" brasses, circa 1750, on a mahogany veneered serving table of 1830, for example. These details can be learned only by study and the observation of museum pieces and authentic reproductions. In general it can be stated that after 1690, all important pieces of fine American furniture were

equipped with brass handles, and usually with keyhole escutcheon plates. To further generalize, simple pieces of furniture displayed simple brasses; pine furniture utilized small turned wooden knobs.

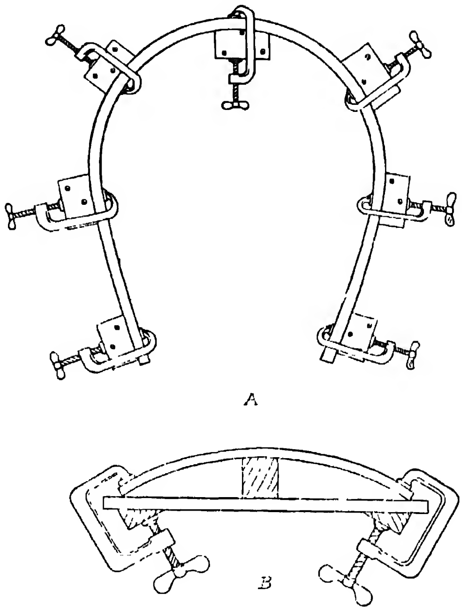


FIG. 8.12. Bending jigs *A*, Bow bending jig, *B*, Combination bending jig.

Hinges. The earliest type of hinge was the butterfly hinge (Figure 8.13), made of hand-forged iron and fastened with hand-forged nails, clinched or riveted. Throughout the eighteenth century, and to some extent the first quarter of the nineteenth century, H or HL hinges (detail B) were extensively used on cupboard doors. Their ends were sometimes cut into ornamental circles or fleur-de-lis, as indicated, and the hammer marks were in all probability purely incidental, rather than the intentional ornamentation noticeable in modern replicas. Strap hinges never enjoyed the popularity of the H and HL hinges on cupboard doors, but

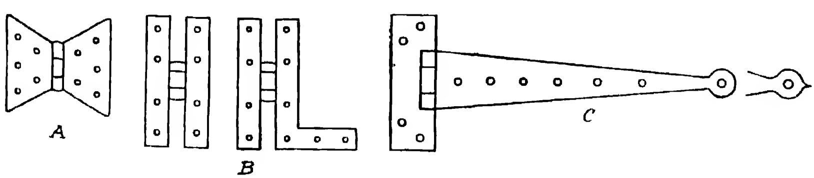


FIG. 8.13. Hinges. *A*, Butterfly; *B*, H and HL; *C*, Strap.

innumerable variations were used on the covers of chests, with their long arms cut into round or spear-shaped ends, as shown in C of the drawing. All were hand-forged and usually beaten thin along their outside edges and ends. During the eighteenth century a rat-tail hinge was commonly used in Pennsylvania, New York, and, to some extent, Connecticut cupboards. Often riveted over iron washers at the backs of the door, this type of hinge could be removed simply by lifting it off its pin.

Another early hinge, known as the staple, clinch, or cotter-pin hinge, was often used on the lids of six-board chests. It was made of two iron cotter pins hooked together, with their ends sharpened into points that were thrust into holes bored at angles through the opposite edges of the boards, after which the points were clinched. They were easily constructed by the local blacksmith. These simple hinges declined in use during the last half of the eighteenth century, disappearing from sight by the end of the century.

When the rule joint for drop leaf tables appeared after 1725, special rectangular hinges were fabricated from thin sheet metal, cut into double patterns of each end section. This pattern was then folded over on itself and welded to make one leaf of the hinge. Used throughout the last half of the eighteenth century and in a more refined form during the nineteenth century, these hinges supplanted the H and HL types on cupboard doors soon after the first quarter of the nineteenth century.

Cast-iron rectangular hinges did not come into vogue until the nineteenth century. Thick, heavy, and brittle, they are never encountered on eighteenth century furniture.

Casters. Equipped with leather rollers, simple casters were used in England early in the eighteenth century. In the latter part of the same century they were turned out in a variety of forms and early imported into the colonies, along with brass furniture hardware. Some sockets were square, others round, plain cast, or of decorated brass, with brass or iron rollers.

REPAIRS

Although the restoration of antique furniture often requires ingenious repairing and refinishing operations, many a conscientious restorer, as we have seen, will not resort to the type of repair that requires the addition of visible pieces of material. Under this category come angle irons, mending plates, extra cleats and even, in extreme instances, corner blocks. It is therefore intended to lump together in the following paragraphs notes on a variety of repairs, many of which can be considered entirely "legitimate" for authentic restoration work.

In passing, it is well to remember that concentrated gazing at an imperfection during its repair tends to magnify it in the worker's eyes. However, if the repaired piece is put aside for a day and re-examined, its appearance will in all probability seem astonishingly improved.

Dents, Gashes, and Various Blemishes. Nearly all well-used furniture will suffer one or more bruises as time goes on. If shallow, the compressed wood fibers in most dents can be coaxed upright by wetting with a few drops of water. In order to insure penetration, however, all vestiges of the water-repellent finish must be carefully removed from the surface of the dent. If this simple procedure does not effect the desired result, steam may be introduced by means of a heated soldering iron over a damp cloth. When the grain of the dent has risen to the level of the surrounding surface, it can be rubbed up to uniformity by sprinkling a few drops of rubbing (parafin) or automobile oil on it and polishing it with a pinch of rottenstone.

Scars and gashes can be filled with stick shellac of the proper color, as explained under the restoration of veneer (page 409). Some craftsmen pare off slivers of identical wood from underneath and glue them into deep, long gashes.

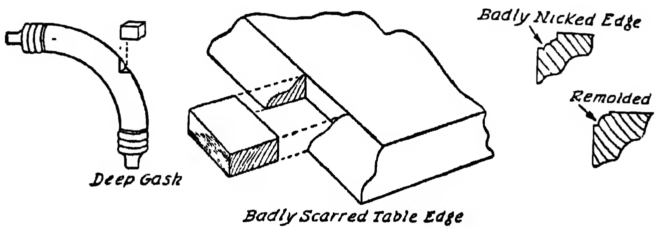


FIG. 8.14

This type of repair may go deeper in more serious scars and blemishes. Figure 8.14 indicates several simple possibilities for repairing, or at least disguising, various relatively deep bruises and cuts. When the glued-in blocks have set in their mortises, they can be worked down to the level of the surrounding surface, then sanded. In the case of damaged corners, it is sometimes feasible to chamfer off the damaged edge, the new design being balanced by chamfering the opposite corner. In other cases it will be found more advantageous to halve on a corner piece of veneer, as in Figure 8.15, trimming the edges flush after the glue has set. Splinters not yet entirely separated from the piece can be glued and clamped back in place, then sanded smooth.

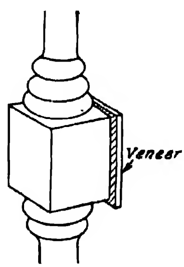


FIG. 8.15. Repairs.

Loose Joints. Many an otherwise damaged chair or table has been consigned to the attic because its legs have become so loose as to render it dangerous. The same is often true of the stretchers and backs. The most satisfactory method of repairing rickety furniture is to take it apart, remove all the old glue, then reglue and clamp it tightly. Before undertaking this necessarily drastic action, however, let us review other possibilities.

Assuming that a thorough examination reveals no loose screws or other fastenings, it may be discovered that the weak legs can be satisfactorily reinforced by means of corner blocks screwed into both rails and legs. In the same manner wide diagonal braces, carefully mitered to fit snugly against the chamfered edges of wobbly table legs, can be screwed firmly to both legs and aprons.

Another method sometimes employed to tighten loose socket joints is to apply liquid glue around the crack and gently rock the loose piece until no more glue can be "absorbed," assisting the process by probing with a toothpick. When a grease gun is available, glue can often be forced into loose joints by drilling a small diagonal hole in some inconspicuous location, preferably on the underside. A wood screw that will fit into the hole is then drilled lengthwise through the center, and soldered on the end of the regular grease fitting of the gun. After the screw is turned a short distance into the diagonal hole, liquid glue can be forced into the weak joint, as in Figure 8.16.

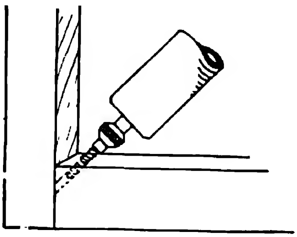


FIG. 8.16. Forcing liquid glue into weak joint.

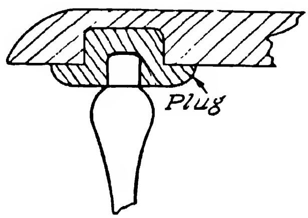


FIG. 8.17 Large socket plugged.

When the leg socket in a chair has become hopelessly enlarged, it can be bored out and a wooden plug inserted as shown on Figure 8.17. The plug, in turn, is bored for a close fit by the leg tenon, after all old glue has been removed. In order to center the lead screw of an auger bit when funnel-shaped leg, arm, back, and spindle holes in old furniture are being enlarged, a dowel is first selected that will fit loosely in the hole. After about ½ in. of the dowel is cut off, a hole is drilled through its center slightly smaller than the screw of the bit. When the dowel is screwed onto the bit, it will act as a guide or jig to center it in the old hole during the boring operation. If the old socket is not too badly enlarged, it can be built up with liquid plastic, which will permanently reset the leg or rung.

There are also available metal rung fasteners that can be applied as indicated in Figure 8.18.

Taking apart rickety furniture for regluing will be greatly facilitated if the furniture is first stored in a heated dry place for a few days. This will lessen resistance by causing the wood to shrink, thus loosening further the already loose joints. The loose parts can then be removed with a minimum of force, after a

thorough examination to determine whether there are any concealed fastenings, examples of which are indicated in Figure 8.19. Although nails are not used in good furniture, or in any lasting repair work, previous efforts by unknown persons

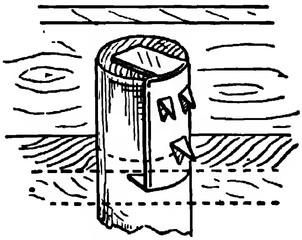


FIG. 8.18. Rung fastener.

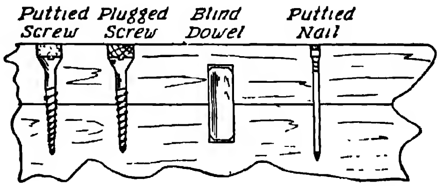


FIG. 8.19. Concealed fastenings.

may have included a countersunk and puttied finishing nail or two. In this case diagonal-nose, side-cutting pliers, properly braced to insure a minimum of damage to the surrounding surface, will usually solve the problem. The legs, rungs, arms, spindles, or bannisters of chairs should be carefully laid aside and marked, so that they can be returned to the same places, exactly in their former positions. This type of systematic procedure will save considerable time, patience, and refitting.

Successful regluing depends upon clean surfaces, entirely freed from old glue. As previously emphasized, fresh glue has no affinity for old glue. The latter can be removed with hot water, scraping, and sanding. To clean out socket holes, strips of sandpaper rolled around a pencil or dowel are usually effective. Vinegar, applied with an old toothbrush, will assist in the removal of old glue, but is not a solvent. It will, however, aid the adhesion of new glue to any residue of the remaining old glue film.

When a thorough sanding of both tenon and socket leaves a joint too loose-fitting for a good gluing job, two strips of friction tape or thin cloth placed crosswise over the end of the tenon or stub will often insure a snug joint. Glue is daubed into the hole and the taped leg or tenon forced into the socket. A disk of cloth may be required to fill up a very loose hole.

When ready to reglue, the clamps should of course be adjusted before the glue is ap-

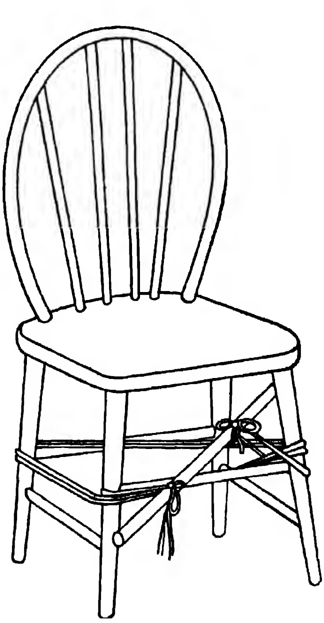


FIG. 8.20. Rope tourniquet clamp.

plied, with plenty of pads to protect the finish. In lieu of clamps, rope can be wound around the whole piece, then tightened by twisting it with a stick, like a tourniquet (Figure 8.20). Some workers use a tightly wrapped cotton rope, which when dampened, exerts a viselike pressure as it dries.

Carcass Repairs. Although the repair of each piece of furniture is a problem in itself, certain types of damage are recurrent, more or less dependent upon the class of joint employed. Large pieces naturally make use of tenons that are wider and often longer than those employed in chairs.

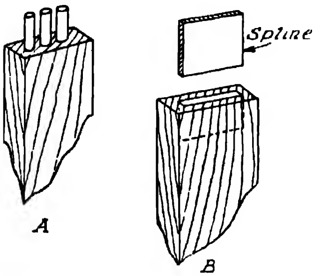


Fig. 8.21. Joint repairs.

Tenons. Depending upon the degree of damage, tenons can be repaired in several ways. The adept at doweling will doubtless prefer sawing the damaged tenon flush with its shoulders, and replacing it with two, three, or more dowels, as in A of Figure 8.21. The mortise can be built up with resin glue, thickened with wood flour if necessary.

Another method is to cut off the broken tenon and mortise it deep enough to receive a hardwood spline, as in B.

Tops of chests, commodes, and dressers before being removed for regluing or straightening should first be examined carefully for hidden fastenings. When these have been removed and only the glue holds the top in place, one corner can often be raised slightly by careful hammer blows from underneath, against a padded wooden block. Once started, a series of wedges driven progressively along the original aperture will usually loosen the rest of the top.

If this method fails, or is impracticable because of splits or other suspected fragility, the glue must be softened. To do this the piece is turned upside down, and a dam of putty built around the outer edge of the overhanging top to retain the water against the glued joint.

Warped Table Tops. In the matter of warping, drop-leaf table tops seem to be the worst offenders, although they do not have a monopoly on this type of damage. An often recommended remedy is to soak the warped leaves in a container of hot water, or to dampen them by means of 2-in. layers of damp sawdust sandwiched between boards, with the top board weighted for as much as two weeks in cold weather. In this method the boards must be thoroughly soaked to prevent splitting when the clamps are applied later. If suitable clamps are not available, 2 × 4's, bolted together with ½-in. bolts, washers, and wing nuts, will prove a satisfactory substitute. When drying out under clamps, the maximum shrinkage will occur at the centers of the boards, where the pressure of the clamps is least exerted. Therefore, in a moderately warm room the clamps should be loosened slightly twice a day, in order to permit the boards to shrink naturally. Unless cleats are screwed to the undersides of boards straightened in this manner,

the cure is likely to prove only temporary, provided the same atmospheric conditions recur.

A more permanent method calls for a continual steaming process, which may be completed in an hour or more. The leaf or board is clamped in a frame of 2 × 4's similar to the one illustrated in Figure 8.22, and slowly steamed by apply-

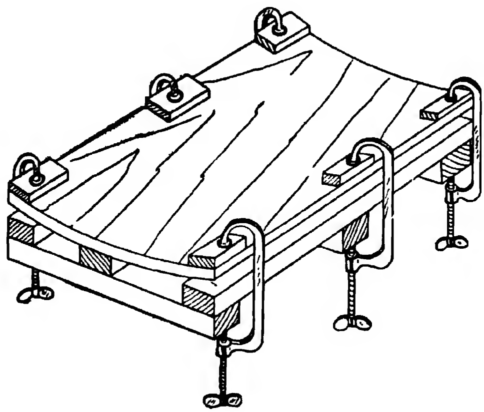


FIG. 8.22. Frame for steaming warped board.

ing a hot flatiron over a damp cloth on the concave side, rewetting the cloth as it is ironed dry. The clamps are slowly tightened successively as the steaming process is repeated, until the board is "pressed" flat, like a garment. Once flat, the clamps are released slightly to permit the wood to contract without splitting. Cleats on the underside will insure a lasting reformation.

Still another method is to place a piece of carpet on the concave surface and apply hot water from a teakettle, the process being continued until the fibers have expanded sufficiently to straighten the leaf, which can then be clamped until thoroughly dry. Dry hot sand applied to the convex surface will straighten a leaf that has been steamed too much.

The same methods can be used to restore the shape of curved pieces that have commenced to straighten and spring out of place. In this case the steaming is applied to the convex side.

Various Fractures. Breaks may be more or less clean cut, across the grain at weak points of small diameter, or may follow the grain in long diagonals. The nature of the fracture and its position will determine the best method to be employed in its repair.

Dowels. One of the commonest methods of repairing clean breaks is by means of a dowel reinforcing both parts. In the case of a broken tenon in a chair rung, however, it will usually be necessary to bore out the socket to a size larger than

it was originally. This will require a snug-fitting plug which can be bored to receive a dowel into the rung, as in Figure 8.23.

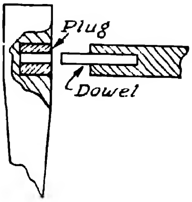


FIG. 8.23. Substitute tenon.

When a lathe is available, another very satisfactory method is to turn a piece of hardwood to the full size of the original tenon, then reduce one end to pin size for insertion into the leg, in the same manner as was described for feet and finials in the preceding section on restoration.

An ingenious, strong repair that makes use of a steel dowel cushioned with Babbitt metal is shown in Figure 8.24. This type of repair is especially useful when a new piece is to be inserted in a table or chair leg that is large enough to receive a ½-in. hole. As shown in the sketch, the leg can be cut off squarely above the break and ½-in. holes bored in both pieces. Because a length of ¼-in. rod is used as a dowel, the ½-in. holes do not have to be as accurately registered as in normal doweling. With the metal dowel in place, both pieces are clamped so that they coincide horizontally, with their most inconspicuous common faces uppermost. Two ¼-in. holes are then bored vertically as indicated, and Babbitt metal is poured into one of the holes until it appears at the surface in the other. When cool, the metal plugs are filed smooth and colored with oil paint.

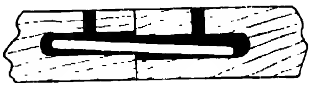
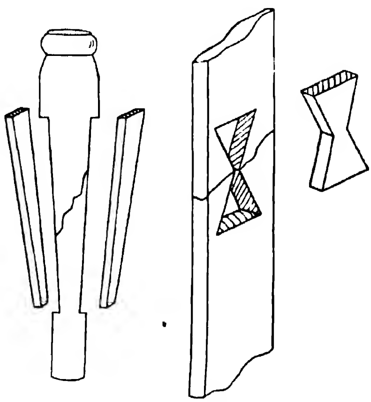


FIG. 8.24 Steel dowel.

Splints. Members too slender for dowels can be satisfactorily repaired by means of a pair of splints, carefully inlaid opposite each other, as in Figure 8.25. On thin flat members, a butterfly wedge of hardwood will often solve the problem.

Split fractures, as mentioned in the first section of this chapter, may be in-



A B

FIG. 8.25. Repairing fractures.

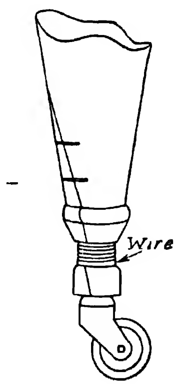


FIG. 8.26. Shank repairs.

conspicuously halved on with glue, clamped, then reinforced with two or three small screws, countersunk and plugged or puttied.

The shank of a loose caster often serves as a lever to split off fairly long sections of a chair leg. A method that often proves satisfactory is to glue and brad or screw the split-off section back into place, and when it is dry, to file or cut a groove near the bottom of the leg, as shown in Figure 8.26. Fine copper or iron wire can then be tightly wound around the groove, leaving room for a layer of plastic wood, which can be smoothed off level with the surface of the leg, and tinted to match with oil colors.

Broken splats. Figure 8.27 shows an easy way to replace a broken splat without taking the back apart. The upper mortise is deepened sufficiently to permit the new splat to be pushed up enough so that its lower end will clear the bottom back or hip rail. The new splat must be the same length as the broken one, so that its upper end will remain in the upper mortise after its lower end slides down into the mortise in the hip rail. This method can be successfully applied to other repairs that seem, at first glance, to require the dismemberment of some parts of the piece to effect the replacement of broken members.

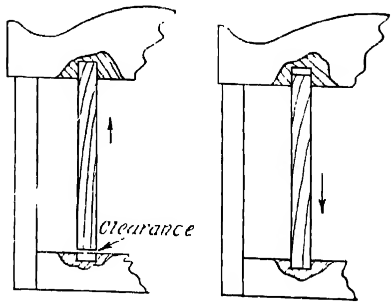


FIG. 8.27. Repairing a broken splat.

Loose Casters. Loose casters of the shank type can be tightened by winding friction tape or rubber bands around them. The socket-type casters can be refitted securely by reinserting them after resin glue has been applied, while it is commencing to harden. For protecting linoleum floors rubber crutch tips over the feet of round chairs or tables will be found very effective.

Knobs. The majority of wooden knobs are fastened in place by metal bolts screwed into the knobs from the back of the door or drawer. When the threads in the knob wear loose, they can be tightened by daubing plastic wood or resin glue in the hole and rescrewing from the back, just as the adhesive commences to dry. It will frequently be necessary to build up a gouged-out back with one or more metal washers.

Sticking Drawers and Doors. Before resorting to planing, slight sticking in drawers that have swelled after the furnace has been turned off can sometimes be cured by rubbing their edges with wax, paraffin, or even talcum powder. If sanding fails to relive the swelling, bad cases will require judicious planing of either the top or bottom edges, or both, followed by a rubbing with wax or paraffin.

Similarly, doors should be planed only as a last resort, because sticking is often caused by loose screws in the hinge plates, which permit the lower edge of the door either to sag, or to be forced out by a tight upper hinge. Cardboard shims

behind a too-tight hinge will frequently straighten up a sticking or nonclosing door. When it becomes necessary to use a plane along the upper or lower door rail, it must be remembered that the grain of the outer stile will be at right angles to the plane, and therefore likely to split off at the outer edge.

Plastics. The many varieties of table tops, lamps, picture frames, and other modern accesories fabricated from plastics are subject to damages that cannot be repaired by the methods employed in rehabilitating objects composed of wood, metal, or glass. In like manner the proper care of plastic articles differs from the methods used to maintain other substances.

Many plastics, particularly Lucite and Plexiglass, have a tendency to accumulate electrostatic charges, which attract dust faster than other types of surface. This calls for the monotonous use of a damp cloth (rather than a dry one, which is apt to cause scratches), unless the electrostatic charge can be reduced. This is possible through the application of a special antistatic wax polish now available commercially, which serves the dual function of providing a protective film and filling fine scratches. Ordinary automobile wax will usually serve as an acceptable substitute. For deeper scratches a burnisher can be used to advantage, with very fine smoothing paper for the more stubborn blemishes, followed by jeweler's rouge for the final polish.

Cracks can be mended with a plastic cement, which can be applied with an eye dropper or an artist's pencil brush. For Plexiglass and Lucite exclusively, there is a welding cement that softens the plastic surface and fuses the two edges into a permanent bond.

REFINISHING

The refinishing schedule for a restored or repaired piece of furniture depends upon the type and extent of the damage, and the nature of the original finish. Common types of marring usually fall into the following groups:

1. Fine scratches
2. Deep scratches, dents, and gashes
3. Worn edges
4. Checking, crazing, and cracking
5. Rings, prints, and spots
6. Alcohol marks
7. Cigarette and cigar burns
8. Miscellaneous stains

When the old finish is in good condition except for a few solitary examples of the above blemishes, it may be patched by methods to be described later. If the surface is small, or the old finish is so badly checked, crazed, or cracked that it cannot be satisfactorily patched, a complete refinishing job will be more economical in the long run.

Types of Old Finish. In most cases a partial refinish will require identification of the old finish. The following notes, which more or less summarize data

presented in Chapter 5, may be of assistance in determining the nature of the original finish.

Wax applied over several coats of shellac will be the finish most encountered in the earliest types of furniture. It is important to identify it because no other type of finish will adhere to it. It can usually be recognized by its feel, or because finger marks show up readily on its surface, or because its thinness permits the grain to show through plainly.

The wax coating can be removed with turpentine, benzine, or naphtha, unless composed of one of the modern liquid self-polishing forms, in which case it will have to be scrubbed off with a scouring compound. The shellac can be dissolved by alcohol.

Linseed oil was also popular as a finish in the early days. Since it is not a surface coating the grain is quite prominent, but there is no waxy feel. Because it penetrates the pores of the wood it cannot be removed.

French polish, another favorite of old-time craftsmen, is often difficult to distinguish from a rubbed lacquer finish. Consisting of successive rubbings of refined white shellac, it is very sensitive to alcohol and fruit juices, but will not scratch white. It, too, can be removed with alcohol.

Varnish of good quality, applied in several coats, gives an impression of depth and body. Cheaper grades are brittle and scratch white readily. Very old varnish tends to become whitish or crystallize, requiring complete refinishing. It can be removed with varnish remover.

Lacquer, while susceptible to the flat, dull rubbed or polished luster of varnish, offers less depth, although a harder surface. It does not become brittle with age, will not show heat prints, and in the better qualities is alcohol-proof. Its solvent is lacquer thinner.

Miscellaneous "short-cut" finishes, such as the colored sealers and varnish stains found on cheap furniture or poor repair jobs, usually lie upon the surface, chip off and must be completely removed. Varnish remover will clean off this type of finish.

Enamel, unless dead black or white, can seldom be satisfactorily patched, owing to the fading of the original color. The best procedure is to sand down the gloss and apply at least one new coat.

Glazed, antiqued, or shaded surfaces can be matched only after considerable experimentation. The trial-and-error method with several samples is the best insurance for a satisfactory patching job.

A Complete Refinish. If the old finish is so badly marred that it must be entirely removed, the operation should not be undertaken until all repairs have been made, except those requiring stick shellac or plastic wood. This will insure that the new wood will receive the same treatment, including discoloration, as the old wood.

Scraping. On flat surfaces scraping is a preferred method, not only for cleanliness, but because it will not disturb the stain in the wood. A common form of

hand scraper is a steel plate with square-cut edges, which is held nearly upright by the fingers near its bottom edge. When pulled or pushed with even pressure at an angle, it will produce a slanting cut which effectively removes a thin layer of the old finish. This type of scraper is also obtainable with a handle as in A of Figure 8.28. The "hook" scraper, shown in B, is perhaps easier to use, because the detachable thin blade in the form of a broad hook is held in a convenient wooden handle.

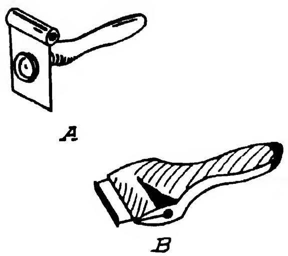


FIG. 8.28. Scrapers

Varnish remover. Because most furniture has relatively few flat surfaces other than the tops of tables and chests, or occasional straight legs, liquid varnish remover is customarily employed. As with most products, the lighter, cheaper types require more applications, thus consuming more time in the end than the heavier, slow-acting types. Furthermore, the heavier grades are less likely to run on upright surfaces.

The use of varnish remover being at best a messy operation, it is advisable not to rely solely upon newspapers to protect the floor. If the work can be done outdoors so much the better, for the fumes from commercial varnish removers are extremely inflammable.

The remover can be applied thickly with an old brush, or can be poured on flat surfaces and spread out with rags. It is allowed to stand until it commences to wrinkle, when it can be scraped off with a broad putty knife or scraper, a stiff brush, steel wool, or wadded burlap. If a scraper or putty knife is used, it would be well to grind the front edge into a slight crown, thus dulling the sharp corners, to prevent gouging. The thickness of the old finish may require several applications of varnish remover, followed by a final coating to loosen the remaining traces. While the wood is still wet, it should be washed off with turpentine, benzine, or naphtha to remove all traces of the wax retardant in the liquid. If this is not done, the new finish may never dry properly. Steel wool is excellent for turnings, and an orange stick or skewer for crevices.

The piece can now be set in a warm, dry location, shielded from direct sunlight to prevent warping. After the surface has thoroughly dried, it should be held up to the light to determine whether the remover has attacked either the stain or the filler. To bring the new wood into harmony with the old it can be moistened with a little linseed oil and just enough burnt umber or other suitable color, rubbed in with the hand or a rag. When thoroughly dry the work should be sanded with 4/0 garnet paper, using narrow strips of fine emery cloth or steel wool for the turnings.

Refinishing Restorations. Old woods previously finished will need little if any filling. In general, a warm brown finish is most suitable for old restored pieces, therefore orange shellac, diluted 50 per cent, is the basic coat. As explained

in Chapter 5, shellac, unlike varnish, need not dry between coats. It should be applied briskly in small brushfuls, going over the surface three or four times. For a particularly smooth coat on a fine hardwood, a light sanding can be administered between brushings.

An excellent brown wax can be mixed from a good grade of yellow floor wax into which a teaspoonful of burnt umber has been thoroughly worked with a small putty knife. If necessary to melt the wax, a double boiler must be used because of the extreme inflammability of the wax.

Butcher's wax, preferred by many finishers, is mixed from ½ lb of beeswax, also melted in a water bath, with ½ pt of boiled linseed oil, ½ pt of turpentine, and a touch of burnt umber added while the wax is still warm.

Each thin coat of wax should be rubbed vigorously with a woolen cloth and allowed to dry in a warm room before the next coat is added. Three or four coats will confer the soft finish so much admired by collectors.

A Partial Refinish. Sometimes a finish becomes dull or cloudy as the result of repeated applications of oily polish over layers of trapped dust. Unless otherwise damaged there is no necessity for refinishing such a surface; usually a good lather of neutral (Castile) soap rubbed on and then wiped off with a damp cloth will remove the film of dirty oil. Stubborn cases may require a gentle rubbing with a solution of washing soda, or a little vinegar in warm water. Colonial pieces can often be brightened with a mixture of equal parts of vinegar, linseed oil and turpentine, polished with a dry cloth.

Fine scratches, such as are caused by a pin or some sharp-cornered metal object often do not cut entirely through the finish into the wood. If not too deep, single scratches of this type can be dull-dubbed with pumice stone and water, then brought up to the necessary polish by adding rottenstone to the pumice and substituting rubbing oil for the water. If the scratch appears to be nearly down to the wood, it should be built up before rubbing, by running in white shellac with an artist's pencil brush or a toothpick.

White scratches, while not deep enough to require filling, have nevertheless penetrated through the stain into the wood, and must be colored After sanding with 6/0 paper or 3F pumice, the matching stain can be applied with a pencil brush, (Figure 8.29). A standard stain for such scratches can be mixed up in the following proportions and kept in a screw-top jar or a bottle:

½ pt orange shellac
½ pt shellac mixing lacquer
1 qt lacquer thinner
1 oz walnut or mahogany oil stain powder

FIG. 8.29. Pencil brush.

The orange shellac and mixing lacquer are blended and then added to the stain, which has been dissolved in the lacquer thinner. Red, yellow, or black can be added to the basic mixture as required. Alcohol

soluble powders mixed with shellac are economical, and textile or straw-hat dyes sold in drugstores will prove satisfactory for narrow scratches.

Deep scratches, dents, and gashes must be filled with plastic wood, which shrinks, or by burning in stick shellac or even sealing wax, as in patching veneer. Plastic wood can be colored to match with oil colors; the opaque shellac cement can be brushed with a lighter or darker color to simulate grain.

Worn edges, unlike scratches, have generally acquired a patina that cannot be penetrated by stain. The resultant polish must therefore be removed by sanding, before the raw wood is retouched as for a white scratch.

Rings, prints, and spots caused by hot dishes or the pressure of heavy objects, if not too deep, can often be rubbed out with pummice and oil on a felt pad cut from an old hat. The rubbing should be gentle with frequent checking to prevent cutting too deep. Adding rottenstone to the slush will bring up the luster.

Other methods of removing white rings include the application of turpentine to restore the color without softening the finish, or allowing alcohol to remain on the spot for a few seconds, then running it off with a piece of cardboard. In either case the spot should be rubbed dry with linseed oil. Sometimes steaming with a hot flat iron over a damp cloth will melt a damaged shellac surface sufficiently to restore the color. The iron should be applied sparingly and kept in motion so that the cloth will not stick to the softened surface.

In the case of deep marks through the protective finish, it is safer to avoid the possibility of penetrating the satin by patching with very lightly applied French polish. Any existing ridges are first carefully removed with 7/0 finishing paper and rubbing oil.

Cigarette and cigar burns usually penetrate the finish into the wood. The charred area must be carefully scraped or cut out clean, in order to determine whether it can be touched up or whether it must be filled. For large areas plastic wood will offer a better surface for artificial graining with a camel's hair brush. If this is done a protective finish must be added and blended by rubbing.

Stains of various origins are inevitable over a period of years. Although most modern lacquer and high-grade varnish finishes resist water, shellac will succumb if the water is allowed to stand for an appreciable period. If water marks cannot be wiped off with turpentine, benzine, or naphtha, they can sometimes be elminated by opening up the finish with light strokes of a lintless cloth moistened in alcohol. If this treatment fails, it will be necessary to employ French polishing.

Alcohol stains on older types of varnish and shellac finishes also turn white, even when the alcohol has been wiped off as soon as spilled. They should be treated as water stains.

The lactic acid in milk often leaves spots that will disappear when rubbed lightly with 3F pumice and water.

Ink spots can usually be removed from a high quality finish in good condition by washing with soap and warm water. More tenacious stains must be rubbed out with pumice and water. If the ink has penetrated through the wood by means

of a scratch or breaks in the finish, the latter will have to be removed so that the ink-stained wood can be sandpapered clean and refinished.

In conclusion it should be pointed out that although modern finishes are of extremely high quality and durability, they need to be thoroughly cleaned two or three times a year. This is best accomplished by washing with a soft sponge which has been dipped in clean water and squeezed out, then filled with suds from a bar of neutral soap, followed by a rinse with clean water and dry wiping. To restore the luster to freshly washed surfaces, a good grade of furniture polish should be used. Cheap polishes, or those that leave grease or oil on the surface, should be avoided because in the long run they serve only to collect and amalgamate successive layers of dust. An excellent home polish is ordinary French dressing (without the condiments), consisting of three parts olive oil and one part vinegar. Rubbed in thoroughly with a flannel cloth it will bring out and preserve the luster which may have been dimmed by the washing and drying.

9

SALVAGING DISCARDED FURNITURE

THAT collection of old-fashioned furniture which accumulated in the attic because Mother or Grandmother hadn't the heart to dispose of it, is again appearing downstairs in new forms and colorings. Native ingenuity, spark-plugged by large doses of practical imagination, has armed itself with a few simple tools and an enthusiastic paintbrush, and is busily engaged in converting what Father darkly referred to as "junk" into useful and decorative furniture, tuned to modern living.

It is not the intention to expound the theory that all old furniture can be remodeled so that it will harmonize with present trends. Nevertheless, it is astonishing what can be done with some of the most inartistic monstrosities of bygone days, once the bulbous excrescences are removed, the ugly lines modified, and a suitable finish or pleasing coat of paint or enamel is applied Because any attic treasure trove will vary greatly in the period and type of construction of its various pieces, as well as in their condition, it will be possible only to generalize as to what can be done in the way of suitable transformations. The following suggestions are offered in the hope of kindling an imaginative interest in the possibilities of successful salvage of whatever discarded furniture may be at hand. Inasmuch as available pieces have already been declared surplus, a boldness of treatment may well repay large dividends, since failure will create no additional loss.

General Procedure. The design and dimensions of old furniture will vary according to the age and locality that produced it. Likewise the construction methods employed will reflect the ingenuity of the cabinetmaker or the factory designer's individual ability or preferences. Much skill was displayed in the construction of early furniture, consequently a liberal education in fine joinery may be obtained during its careful dismemberment.

It is this process of separating an old or damaged piece of furniture into its component parts that is the heart of the salvaging operation. Here it is that haste will indeed make waste, if the joints are brutally knocked apart. As ex-

plained in Chapter 8, successful furniture dissection depends upon a patient approach and a gentle application of moderate force. The few simple rules already enunciated can be recapitulated briefly as follows:

1. Don't *knock* a piece of furniture apart if it can be unscrewed or disassembled by gentler means.

2. Don't use a hammer if a mallet will do.

3. If a mallet must be used, protect the part being hammered with a piece of scrap lumber.

4. The older the piece of furniture the more unorthodox, from a modern standpoint, may be the methods of joinery. Considerable patient probing may be required to detect concealed screws, bolts, or various types of metal braces, which will badly tear the joint if they are not removed before opening it up.

5. Glued joints without screws can often be worked or "rocked" gently apart after any existing pegs have been removed.

6. To sum up, use force only as a last resort.

Finish. Often the parts of the converted pieces of furniture will be assembled or repaired from several pieces constructed from different kinds of woods. Faced with the problem of one harmonious treatment for oak, cherry, maple, and mahogany, for example, the simplest solution is to paint. The choice of paint, enamel or lacquer, in one or two tones, will of course depend upon the other furniture and accessories, as well as upon the general treatment of the room. Here is where peasant painting or stenciling will often prove a happy compromise. The application of paint, undercoaters, enamels, and lacquers has been covered in Chapter 5.

Veneers. If the veneered surface remains sufficiently intact, repairs can be effected by means of the various methods discussed in Chapter 8. Should the decision be to paint over the veneer, the necessary repairs need only be concerned with providing a smooth and impermeable surface. To this end, pieces of cardboard of the proper thickness can be economically substituted for patches of missing or damaged veneer, provided their exposed surfaces and the adjoining areas are coated with a good grade of shellac. A light sanding with fine sandpaper will reduce any surface imperfections to the smoothness of the surrounding veneer.

Quite often the poor condition of the veneer will have been the main reason for discarding the piece in the first place. In this case there may be little choice other than to remove all the veneer before painting. A sharp chisel can be successfully employed to peel off the thin veneer layer, provided that care is used to prevent gashing the under surface. Once the veneer off, the exposed surfaces can be planed and smoothed down with graduated grades of sandpaper, after all indentations have been filled flush with crack filler.

By-products. Aside from the screws, bolts, and metal fasteners that will collect when separating the component parts of old furniture, the amateur salvager who proceeds with care, will find that his efforts will be well repaid by the store of fine and often rare woods he will accumulate for craft use. Many drawers and

furniture backs provide good three-ply panels, and drawer sides yield excellent pieces of gumwood. Interesting moldings can also be salvaged with a little patience, and hardwood fronts and tops with good grains can be preserved, if in dismantling care is exercised.

Trunk Camouflage. In almost any storeroom at least one example of an old-fashioned hump-backed trunk can be uncovered. They were well made in various sizes, and usually succeeded in resisting the best efforts of enthusiastic baggage smashers. If one of the smaller sizes is available, it requires only the application of some quick-drying lacquer to transform it into a colorful pirate's treasure chest for the storage of children's valued toys.

A bright red or maroon is usually well received by the younger generation. After the background has dried, the reinforcing outside cleats can be lacquered black to simulate heavy iron bands. All of the metal work, including the lock, hasps and corner pieces, are also painted black. If the tray is intact, youthful realism will probably demand its removal as out of character in such a rugged replica. Even when keys are available for the old lock, it would be advisable to throw them away and jam the lock so that it cannot catch.

PIANO BENCH AND STOOL RETOUCHING

Sofa Table. A transformation that can be accomplished by the use of a paintbrush as a magic wand may be performed on that long, rectangular piano bench that was banished along with the upright piano. A suitable undercoat, followed by a coat of enamel or lacquer, and presto, it becomes a sofa or cocktail table. Or it may be peasant-painted, or if constructed of mahogany, walnut, or some other good cabinet wood, it can be bleached into one of the popular light finishes.

If the bench is much over 18 in. high, it will be advisable to cut the legs down to aid in the deception. Care should be exercised, however, not to lower its height to such an extent that the spreaders will be in a disproportionate location. If the legs are still firm, however, it may be possible to remove the spreaders and fill up their mortises.

Vanity Stools. An old-fashioned piano stool also makes a satisfying project for easy conversion into a seat for milady's dressing table. Paint and simple upholstering of the top will transform a Victorian vulgarity into an interesting adjunct to a powder room. Furthermore, if the stool is the type which revolves on a rising screw, it can be adjusted to the height of various users.

The top can be padded and covered with a muslin liner as explained in Chapters 2 and 7. The outer covering material can be tacked out of sight underneath the seat, or secured around the edge with upholsterer's tape and special tacks. Painted to harmonize with the room and its furnishings, the stool will prove an effective accessory to the feminine beautification program.

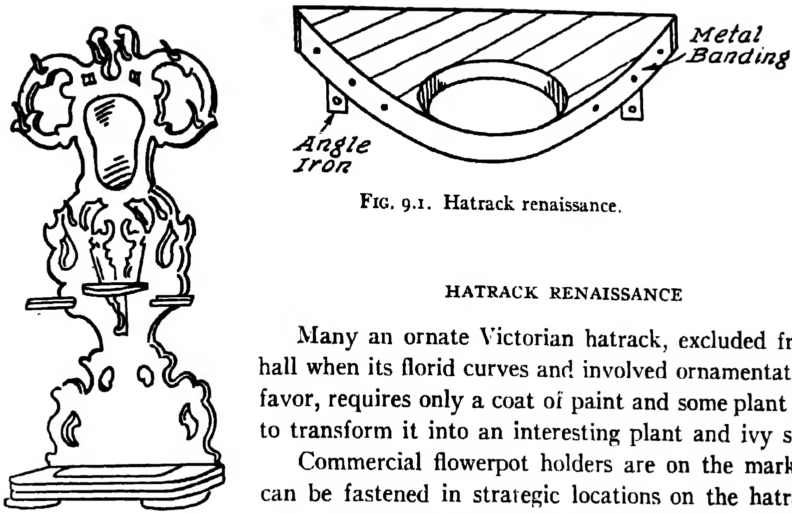


FIG. 9.1. Hatrack renaissance.

HATRACK RENAISSANCE

Many an ornate Victorian hatrack, excluded from the hall when its florid curves and involved ornamentation lost favor, requires only a coat of paint and some plant holders to transform it into an interesting plant and ivy stand.

Commercial flowerpot holders are on the market that can be fastened in strategic locations on the hatrack. If not readily available, they can be improvised from wooden shelves into which half circles are cut at the front, with metal strapping tacked around the outside edge to fit painted flowerpots, as shown in the detail in Figure 9.1. The shelves can be fastened in various positions on the hatrack with angle irons. This method is of course suitable only where the matter of dripping is unimportant.

Since hatracks apparently varied in form with the whims of their designers, the one shown in the drawing can be considered only symbolic. Rectilinear types are less susceptible to conversion.

CIRCULAR DINING TABLE PROJECTS

That early golden oak or imitation walnut dining table with its round extension top, massive center pedestal and floridly curving feet, can be retrieved from its enforced retirement to render added years of service in a modern setting. Once it has been reduced to its component parts by means of monkey wrench and screwdriver, it can be reassembled into several pieces of useful furniture, with a chaste coat or two of paint or enamel concealing its former ornate finish.

Coffee Tables. The round top may prove of too large a diameter to warrant the surgery necessary to dwarf it to coffee table height. In a large room, however, or on the terrace, such a table may not be out of proportion to the scale of its surroundings. All that is necessary is to cleat the two semicircular halves together, underneath, by cross-lapped strips thick enough to act as supports for the old legs, after they have been upended and reduced to an approximate 18 in. height, as in A of Figure 9.2.

For the average-sized room a semicircular cocktail or coffee table constructed

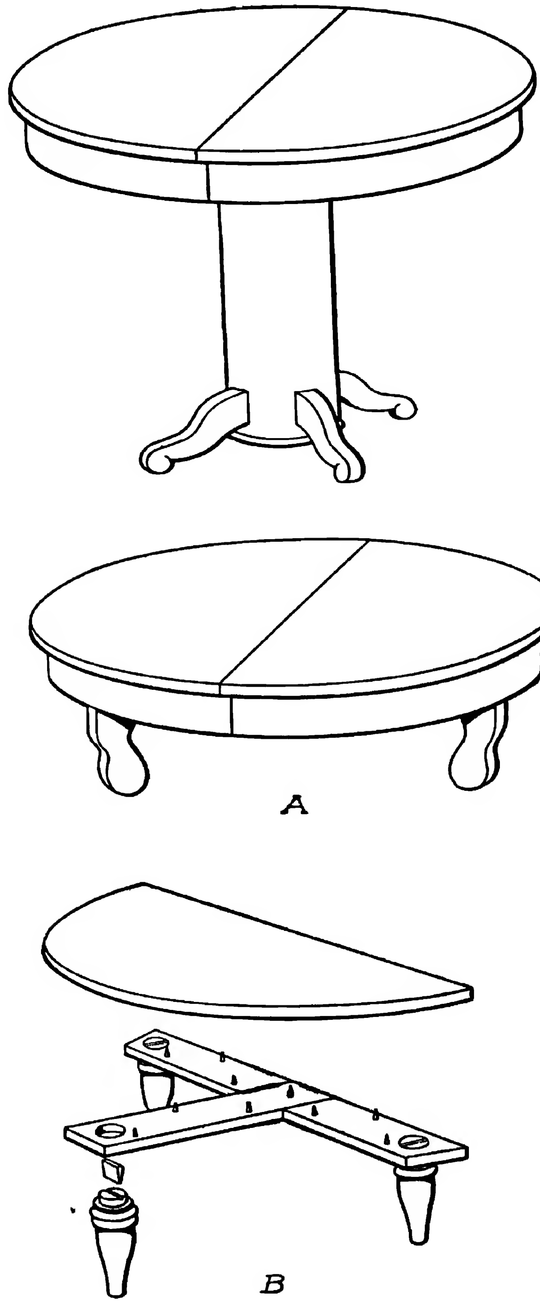


FIG. 9.2. Dining table projects.

from a half section of the old table top will prove easier to reconcile with other furniture. Its construction is similar to that of the preceding table. As shown in detail B, T-shaped lapped cleats are cut from material that is thick enough to provide adequate mortise surface for the three legs. The latter can be composed of tapered rolling pins, sections of twisted drapery rods, or sections of legs reclaimed from discarded occasional tables, spooled whatnots, or from turned legs of the type illustrated in B of Figure 9.2. Depending upon the wood from which the legs are constructed, it may be possible to remove the factory finish and apply a modern version of the presently popular blonde treatments.

Console. As discussed in preceding chapters, a console is a shelflike attachment to a wall, usually located at table height from the floor. Although often provided with a pair of exterior legs, a console may consist of a half-oval or semicircular shelf bracketed to the wall.

For this type a section of the round table top can be used as the shelf, supported by part of one of the curved legs of the old table, as in C. If no studs can be located at the point where it is desired to fasten the console, toggle bolts can be used to anchor it against holes bored through the laths in the wall. The bolt heads are countersunk and covered with suitable crack filling compound.

Umbrella Stand. With all bolts and fastenings removed and their holes plugged up and sanded, the hollow round pedestal of our dining room table makes a satisfactory umbrella stand, almost "as is." The only required addition is a tin can of the proper diameter, to catch the drippings, as indicated in D. This should be forced down to a height which will permit the heads of ladies' short umbrellas to protrude. If necessary, a block of wood can be fastened to the end to hold the can in place. A coat of paint or enamel and a gay stencil will complete the job.

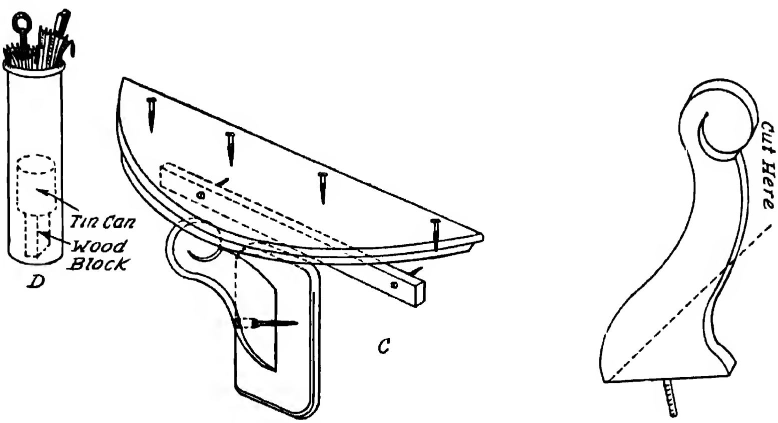
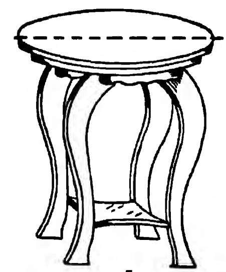


Fig. 9.2. *C* and *D*. Dining table projects.

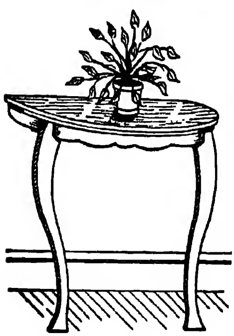
OCCASIONAL TABLE TRANSFORMATIONS

The average attic has at least one occasional table stored away under its eaves. Some of these exiles are relatively undamaged, having been sentenced to oblivion by reason of their ornate designs or ornamentations, which so definitely "date" their origin in a period that the knowing frown upon for its legendary lack of taste. Other tables of cherry, bird's-eye maple, rosewood, as well as the popular mahogany, walnut and oak, have had a leg shattered, a shelf damaged, or the top split by careless handling.

Parts of these discarded tables can still be used in assembling modern pieces, particularly when the finish can either exploit the popular bleached effects, or an enamel or lacquer coating.



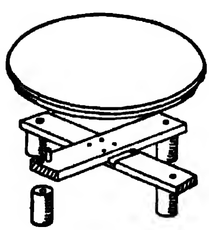
A



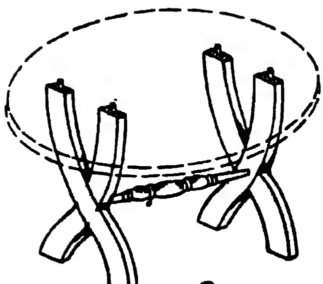
B

Console. As previously mentioned, although consoles are usually fastened to a wall, their front edges may be supported by a pair of legs. Hence, a table such as that illustrated in A of Figure 9.3, once deprived of its useless shelf, can be ripped in half to form two consoles on either side of an old bureau mirror attached to the wall. Cleats are nailed or screwed to studs in the walls, or toggle-bolted to the lath, to support the ripped portions of the table tops at the height of the legs, as in B. The latter, if broken, can be repaired with doweled portions cut and sanded to match the original legs. If the table is too deep for halving, it can be cut into thirds or quarters. After all screw holes and mortises are plugged and sanded, the consoles can be painted to match the woodwork of the room and will prove useful as plant holders in any room, as card and letter holders in the hall, or as plate or silverware servers in the dining room.

Cocktail Table. As indicated in C, if the top of the discarded occasional table remains intact, it is a simple matter to lap a pair of thick cleats so that four short legs can be tenoned into their ends. These legs may be cut down from the original table legs, as in the case of the converted dining room table, or may be sec-



C



D

FIG. 9.3. Occasion table transformation.

tions of an old dressing table, radio cabinet, sewing cabinet, chair or whatnot.

If the original legs of the old table are not of a suitable shape for straight amputation to an 18-in. height, it is sometimes possible to use them in an interesting version of the cross-legged, camp-stool fashion. As shown in D, a symmetrical section of the original legs is selected, and each pair cross-lapped at an angle that will permit their upper ends to be doweled into a frame or cleats, for attachment to the underside of the table tops, 18 to 21 in. from the floor. To provide the necessary rigidity a spreader is tenoned between the legs at the centers of the laps. This spreader may be a ¾-in. dowel, or the rung, spreader, or spindle from an old chair, turned or plain.

Gateleg Table Consoles. A modern form of console that is gaining increasing popularity as living room, kitchenette, or foyer floor spaces continue to shrink in size is one that has a drop leaf with a pivoted gate leg or support to hold it when open. Here is where the old gateleg or drop-leaf table, perhaps with a damaged top, comes out of retirement to a warm welcome.

Whether or not the top or one or more legs must be repaired, it will be necessary to rip it down the center to make two consoles. Even should only one be required, the rule joint of the part that is to be fastened against the wall must be ripped off, after the hinges of the extra leaf have been unscrewed, and the rear set of legs and gateleg removed. The rear apron can then be replaced flush along the ripped portion of the table top, or a new apron constructed for use as a cleat with which to attach the console to the wall.

Such a table is particularly effective in the foyer of a small apartment or bungalow, when flanked by built-in cabinets that are flush with the stationary part of the table top. Equipped with wooden doors, the shelves or shallow drawers of the cabinets can be arranged to house the china, silverware, and linen for a simple meal for three or possibly four, depending upon the depth of the drop leaf. Care must be exercised that no scatter rug or carpet edge interferes with the swinging leg.

Collapsible Midget Workbench. For the hobbyist engaged in small projects in a confined space, the extra leaf of a gateleg table or the top of any medium-sized discarded occasional table can be easily equipped as a small workbench, which can be quickly dismantled for flat storage. Iron pipes with one end threaded are cut to the height of the desired legs, and threaded flanges screwed to the underside of the bench top. The floor can be protected from the cut ends of the pipe legs by wooden plugs or by rubber crutch tips. To dismantle, all that is necessary is to unscrew the pipes from their flanges.

DRESSING TABLE FOUNDATIONS

That old kitchen table that was displaced by the modern enameled-iron product can return to the light of day as a skirted dressing table with little modification.

Its scarred top can be covered with plywood, Presdwood, linoleum, a mirror, or gay chintz covered by a sheet of plate glass.

After the legs and aprons are painted ivory or what-will-you, all that remains is to tack around the edge as a boudoir skirt, ruffled organdy or whatever other material the fancy dictates.

For a half-round vanity, the other half of the famous round dining room table can be cleated and bracketed against a wall like a console, or if preferred, provided with simple legs, and skirted in approved powder-room style. Used in this manner its rounded apron should be left in place to provide a recessed backing upon which the skirt can be tacked. Available small cardboard chests of drawers commonly used for lingerie can be set on either or both sides under the skirt, if further carpenter work is not deemed desirable. A mirror from some other discarded piece of furniture may be salvaged and hung on the wall at the proper height.

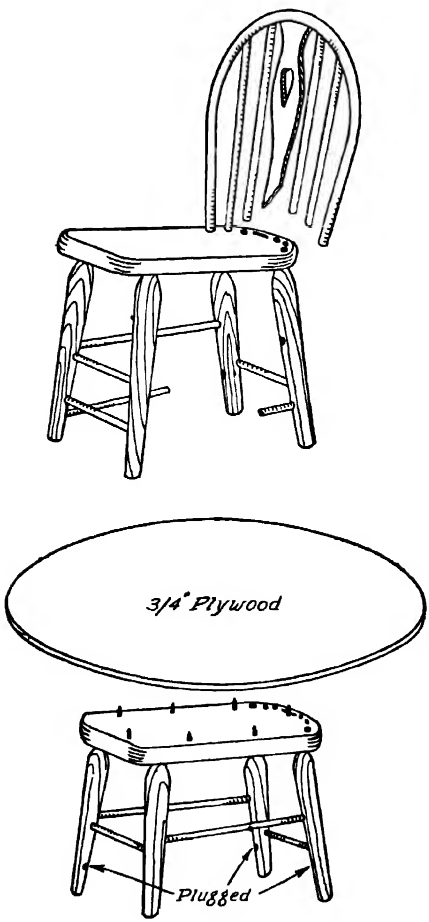


Fig. 9.4*a*. Side chair salvage.

CHAIR LEGERDEMAIN

A major cause for the banishment of many of the chairs to be found stacked away in the corners of attics or basements is the weakening or splitting off of their backs. Often the four legs remain firmly attached to the seat, influencing the thrifty housewife to put the piece aside for repairs on "some rainy day."

Coffee Tables. Many side chairs with solid seats have identical front and back legs tenoned into place at equal angles, as indicated in Figure 9.4*a*. Even if the chair seat is split, a harmonious framework remains that can be converted with little effort into a small coffee or chairside table. Since the frame of the average chair seat is 16½ to 17 in. high, the addition of a round plywood top will be the right height for a coffee table. In case the seat is split it can be cleated together from below and the table top fastened to the old seat by screws from underneath, as in detail B. If a circular, oval, or irregularly shaped occasional table top of the right size is available

among other discarded furniture, it may prove suitable for grafting onto the chair seat. Marble tops from old tables make interesting modern coffee or cocktail table tops, and can be fitted to an old chair seat if the wooden frame holding the marble remains intact. Frequently a heavy plywood backing or bottom, screwed to the frame of the marble top, will offer sufficient purchase for fastening the top to the chair seat. Filler blocks should be inserted near the center, between the plywood and the marble. If the chair seat is padded, it will of course be necessary to remove all upholstery and lay bare the seat frame. When there are double spreaders between the legs, one can be removed and its mortise plugged, or filled and sanded.

Footstools. A chair seat having identically shaped legs, equally raked, can also be converted into a handy footstool for use by the man of the family when he stretches out in his easy chair. Some chairs with padded seats have legs that require only equal amputation for conversion into satisfactory footstools. The legs can be 4 to 6 in. long, depending upon the location of the spreaders and the shape of the legs. It may be necessary to taper or file down the sawed-off ends of the legs to preserve a graceful contour. In any event it is desirable to fit the height of the footstool to the preferences of the person who is to use it most.

Irregularly shaped solid chair seats can sometimes be band-sawed to a semi-round effect before being padded. Hair and cotton padding can then be wadded down and held by a canvas or muslin liner tacked to the bottom of the stool, or around the edges. The outer fabric can then be tacked underneath, or finished off with upholsterers' tape and tacks.

Book Tables. Many a comfortable mission or fumed oak morris chair has been exiled from the family circle for no greater crime than that of being old-fashioned. Solidly constructed along simple lines, this type of rugged chair can be easily converted into a lamp table with an underneath bookshelf or trough, suitable for either the basement playroom, or the outdoor living room.

After the hinges of the adjustable back are unscrewed and the screw holes in the frame plugged up, a plywood or matched board bottom is screwed to the underneath edges of the chair rails, slightly recessed. A more craftsmanlike job would be to rabbet the rails and set the bottom flush. If the rails are wide, and a clearance of 12 in. or more exists between the chair arms and the tops of the rails, the bottom may be omitted, and a V-shaped trough attached to cleats horizontally across the seat rails, Figure 9.4*b*. In this case the bottom of the trough can extend below the rails in an amount sufficient to insure a sharp angle to hold books or medium-sized magazines.

An optional treatment of the seat space enclosed by the rails is to attach a bottom, then hinge two covers to a common divider, either horizontally or vertically across the seat. The covers rest on cleats screwed to the insides of the chair rails, so that the covers are flush with the upper edges of the rails. Small sash knobs complete the construction of these covered catch-alls for knitting, playing cards and chips, rubbers, gardening tools or barbecue paraphernalia.

A fourth method of utilizing this undershelf is to line it with a metal pan for

ivy or plant pots, similar to the side receptacles in the flower table pictured in Figure 3.10. A bottom will be needed to support the metal liner, which may have a hole with a plug inserted for occasional drainage.

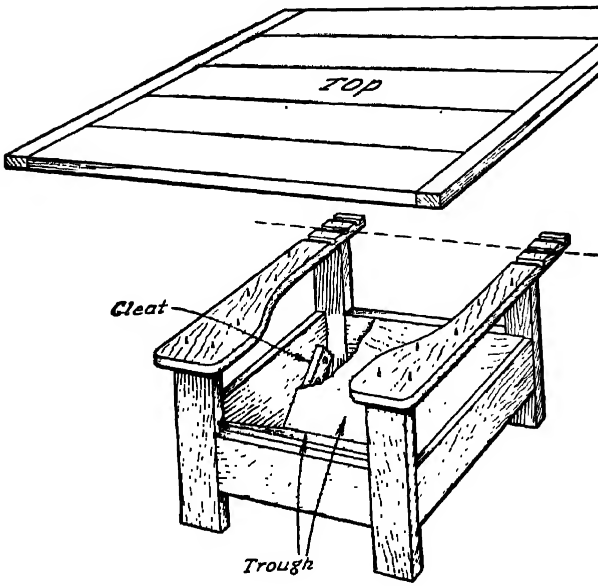


FIG. 9.4*b*. Morris chair book table.

Morris chairs usually have arms from 24 to 26 in. high, which make ideal supports for any type of table top desired. With a heavy, mission type of construction, a thick table top is indicated. Either ⅞-in. boards bound with wide cleats, if a rectangular or octagonal style is adopted, or plywood with 1¼- or 1½-in. mitered strips or veneer attached to its edges to counterfeit thickness will satisfactorily carry out the proportions of the rugged underframing.

The top should be wide enough to extend beyond and conceal the heavy arms to which it is screwed. In many cases not only the rear extension that contains the notches or metal notching device for adjusting the reclining seat back, but a considerable portion of the projecting front arms must be sawed off to insure concealment under the projecting edge of the table top.

Magazine Rack. The curved back of a broken-legged chair can be salvaged as the divider and handle of a magazine rack, such as the one shown in detail C, Figure 9.4*c*.

The base of the rack pictured in the drawing is the top of an old narrow end table, which has been detached from the side pieces. A frame of ¾-in. material about 1½ in. wide is tenoned together in a shape approximately the over-all size

of the base. It is then drilled to receive ½-in. dowels 9 in. long, with corresponding holes in the base. The holes can be 3 in. apart and extend entirely through the base, but only part way into the underside of the frame.

The chair back is cut down and inserted into holes drilled across the center of the base, being held rigidly to the frame by horizontal dowels. Sections of the old chair legs can be tenoned into the underside of the base for feet.

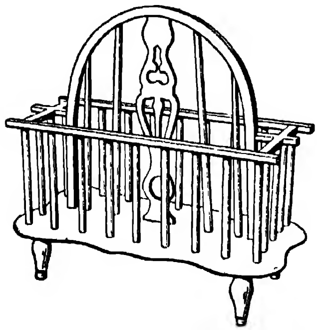


FIG. 9.4c.

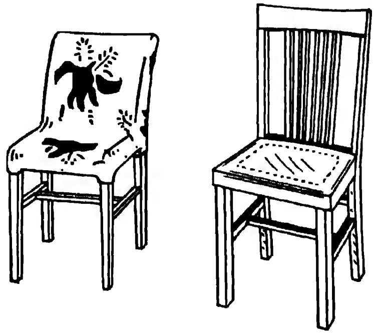


FIG. 9.4d Upholstered side chairs.

Upholstered Side Chair. The once popular but unimaginative rectilinear dining chair pictured in Figure 9.4*d*, with sturdy leatherette seat and uncompromising back, can be converted into an attractive side chair, provided that an almost complete renovation is undertaken. This will require a tapering of the square legs, removal of the hard seat, and a lowering of the top back rail. This latter operation requires the removal of the rail, and the cutting off of the uprights and splats so that when tenoned back into the mortises in the top rail, the over-all height of the chair will be 32 in., to allow ½ in. for padding.

The upholstery proceeds much as explained in Chapter 7 (page 380). Wide webbing is woven in the seat and around the back as a foundation. Then a burlap covering is added to hold the moss padding, over which a layer of felted cotton is held in place by denim or muslin. A colorful glazed chintz can then be tacked in place to the underside of the seat and along the edges of the back.

Soda Fountain Chairs. Not infrequently there are discovered in the gloomy depths of some secondhand furniture shop a pair, or a half-dozen of those twisted wire-backed drugstore chairs, which were customarily grouped around marble topped "ice cream tables" before the advent of booths and chromium fittings. A coat of lacquer or enamel, and a bright cushion to cover the round hardwood seat will not disguise the lines of these chairs, but rather, by calling attention to their commercial origin, will accentuate an amusing reversion to a bygone era.

A group of these chairs around a round-topped, barrel-supported table in the rumpus room, will withstand considerable punishment, and if the cushions are

finished in waterproof material, they are excellent weather resisters on porch or terrace.

MIRROR MAGIC

Many old fashioned bureaus, dressers, washstands, and dressing tables have mirrors fastened to upright arms by means of metal pivots. If the silvering on the back is in good condition, it is a simple matter to unscrew the pivoting device, fill up the screw holes or miter with crack filler, paint, enamel, or lacquer the frame, and attach it to the wall by suitable fastenings.

A majority of these old mirrors consists of a good quality of plate glass, with beveled edges. If the shape of the frame is not suitable for blending into the general treatment of the room it can be removed, and the mirror fastened directly to the wall with bent angle irons, or other modern wall fasteners.

Provided the edges are not beveled, a glazier can cut the mirror to fit into desirable wall spaces, such as the narrow section between twin windows, bathroom wall or cabinet spaces, backing for a built-in niche, or to fit inside closet doors and as tops for small vanities.

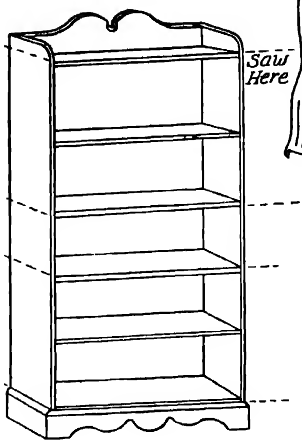
Coffee or Cocktail Table. With modern occasional tables often going in for clear, colored, or mirrored glass tops, an oval, round, or rounded-corner mirror and frame are just the things for the top of a modern coffee table.

Since the backing of most mirrors is too fragile and insecurely fastened to their rabbets to hold the glass up under the horizontal strain to which a table top is subjected, it will first be necessary to substitute a suitable plywood back. Unless the rabbet is wide enough and deep enough to support the screws that will be required to fasten the new back, it must be screwed to the underside of the frame itself. By cutting the backing ¼ in. scant all around, its edge will be recessed out of sight in a table 18 to 20 in. high.

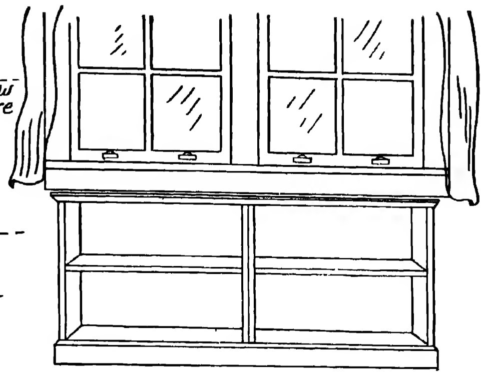
If the silvering is in poor condition, it can be scraped off with varnish remover, then thoroughly cleaned with concentrated ammonia and wiped with a wet chamois skin. The glass can be used as a clear-glass table top, with a plywood backing that has one side finished in grained hardwood. Interesting flat objects can be glued in the space between glass and the back, including preserved butterflies. An optional method of decoration is to use ordinary plywood either stenciled, peasant-painted, or covered with a piece of left-over chintz or pillow covering.

The same procedure can be followed with suitably shaped picture frames, provided their faces are not coated with imitation plaster carvings, which will chip off under normal use as a table top.

Any one of various types of legs already described can be mortised and tenoned through the backing into the frame. Aluminum or copper tubing, with rounded wooden plugs forced into the bottom ends, will blend well with the modern glass top. A recent trend is the use of tapered satin-finished brass legs, which are available at some supply houses.

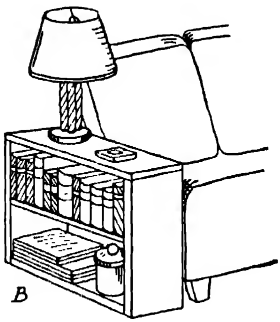


A



C

FIG. 9 5. Bookcase dissection.



B

BOOKCASE DISSECTION

Many an open-faced bookcase has been relegated to the attic because of its ungainly height. If otherwise sound, a little surgery with the saw may be all that is required to reduce an awkward giant to a pair of trim bookshelves, as shown by the dotted lines in A of Figure 9.5. If the backs are too unsightly for use as couch ends or bedside stands, they can either be replaced by plywood, or covered with a thin plywood veneer, as conditions require. It is also advisable to add projecting plywood tops to cover the end grain where the sides were sawed off.

Another interesting use for a pair of these low bookshelves is side by side, under a window. In this case a long board is added for a continuous top, and a built-in effect can be achieved by attaching a continuous base a few inches in height, as illustrated in C.

CHEST-ON-CHEST

The graceless effect that distinguishes much of the discarded furniture in many homes is traceable to the tall, too-slender legs that were in vogue at the turn of the century. The resulting silhouette is that of a top-heavy body balanced precariously on spiderlike stumps.

In many cases a minor operation, only, is indicated. Modern proportions appear as soon as the legs are sawed off. Depending upon surrounding pieces of furniture and the decorative treatment, it may prove advisable to add either a recessed base or attach a mitered baseboard to the outside bottom edges.

Figure 9.6 shows examples of a common, factory-made dresser (detail A) and chest (detail B), which can be combined, by elementary carpentering techniques, into an interesting chest-on-chest, as shown in C. The dotted lines in A and B

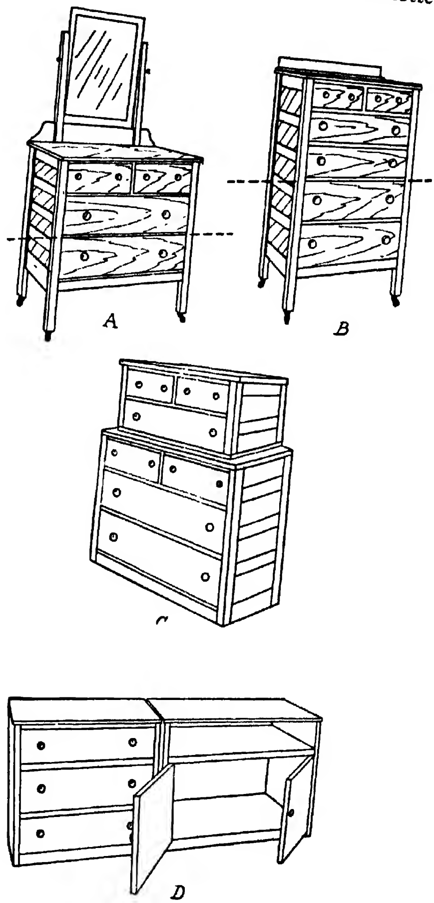


FIG. 9.6. Chest on chest.

indicate how the magic saw is employed to reduce both pieces to sizes that can be fastened together to form a harmoniously proportioned modern chest.

The surplus pair of drawers can be used in built-in conveniences, or may be matched by the construction of an identical pair, or of a cupboard, if no discarded chest of the same styling is available. If the original pieces were equipped with simple round handles, a good finishing job will complete the transformation; otherwise any type of conforming handles can be attached.

DRESSER UNDRESSING

The antedeluvian dresser pictured in Figure 9.7, after three saw cuts, some unscrewing, and the addition of a board top and some coats of lacquer, can be expanded into three serviceable pieces of furniture.

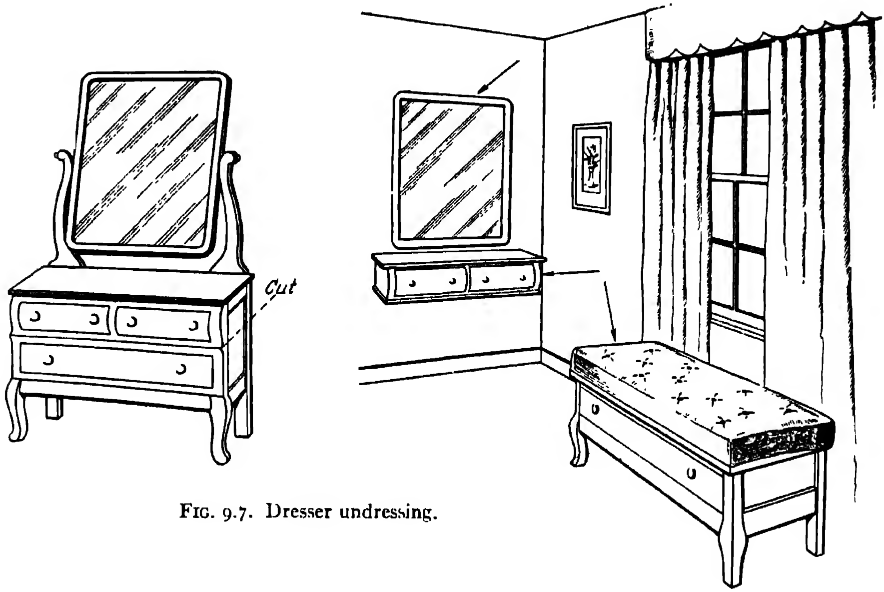


FIG. 9.7. Dresser undressing.

As shown in the drawing, the pair of small upper drawers are divorced from the lower part by sawing across the sides and back on a line parallel to the drawer rail. This leaves a bottom drawer on legs without a top. The latter can be glued up or cleated from narrow boards and fastened in place so that it extends ½ or ¾ in. on all sides to form a window seat having drawer space for extra linen or blankets. Inside cleats will be necessary to hold the severed side panels in place at the top. The cushion can be separate as shown, or upholstered directly to the board top.

To finish off the sides it will be more economical to fasten thin pieces of plywood to cover the panels and their cutoff lower edges than to provide a new bottom. By fastening the two-drawered top section against the wall at the proper height, a small skirtless dressing table-console results. In fastening this section to the wall it is best to rely on heavy angle irons screwed to the studs, as well as toenailing through the back of the frame. If the stud is located in the center of the dressing "table," a heavy curved support similar to that improvised for the console constructed from the dressing room table can be used. The old mirror is unpivoted from the curved arms and bracketed to the wall at a height convenient

to the user. Painted to match the woodwork of the room, at first glance the three pieces appear to be a custom-built suite.

KNEEHOLE DESK SURGERY

Old office-type desks lose their usefulness either because their tops become so badly damaged that they are believed to be beyond economical repair, or because their businesslike design clashes with the decorative treatment of the home. As in many examples of outmoded furniture, the lines of old library desks can often be purified by the removal of roccoco overcarvings and ornamentations, after which a paint job will often render the discarded piece a harmonious member of the downstairs accessories. Sometimes the drawer sections have succumbed to rough treatment by various members of the family, as the ownership of the desk is transferred down the line. If these drawer compartments remain intact, or can be repaired so as to render continued service, much can be done to retain the usefulness of this type of discarded furniture.

Tops. If the desk is of not too cumbersome a size, and the veneer of the top is peeling off or has been damaged beyond reasonable repair, it is best to remove the veneer and work up from the raw undersurface. Repeated sluicings of trisodium phosphate in hot water, or a steaming with wet cloths under a hot flatiron, will loosen the remaining veneer so that it can be eased off with a putty knife or thin chisel. Most of the old glue can be soaked off, or leveled with an old chisel. If a sanding machine is available, much of the hard labor can be eliminated by the use of coarse abrasives. The end result should be a level surface smooth enough to offer a good gluing medium for whatever outer surfacing material is selected.

Reveneering is possible, but as explained in Chapter 6 (pp. 362-3), it requires not only considerable patience and preparation, but suitable clamps or weights A hardwood plywood top is in reality a kind of veneer, but owing to its thickness, is able to bridge the uneven gaps that may remain on even the best prepared undersurface, and still offer a smooth upper, desk top surface. As in veneering, the glue must be of the proper consistency, and sufficient clamps or weights used to insure a good bond. If the desk is to be painted, the plywood edge can be fairly well concealed. Otherwise it is advisable to bind it with a mitered veneer whose width is equal to the combined thickness of the old-and new desk tops.

Linoleum in a pastel shade that will harmonize with the decor of the room or that of some prominent dark lampshade, is easy to cement to the old desk top. Plastic, chromium, or aluminum edging strips can be used if they harmonize; otherwise paint can be used to obscure the glue line. A modern treatment emphasizes cemented leatherette, in brown, maroon, or dark green.

Drawer Sections. When the desk top is not considered worth repairing, or it is not desired to retain the entire piece in its original form, the drawer compartments can be sawed off from the top and back to render useful service as bedside

commodes, couch end cabinets, or built into wall cupboards and attic eaves, as indicated in Figure 9.8.

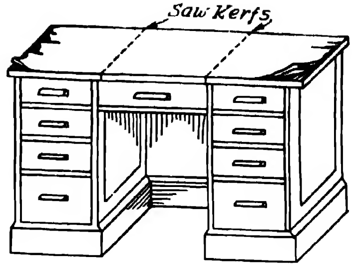


FIG. 9.8. Knee-hole desk surgery.

Where space must be conserved, the center drawer section can be used with its portion of the top cleated to a corner wall space, to form a small built-in desk or work table. Fitted with a side of solid material, or a stuck panel, a large kneehole desk can be cut down to a medium size dressing table, with a set of draws on one side, and a mirror top. In fact, these drawer compartments, suitably topped, have endless uses, limited only by the imagination of the furniture converter.

Discarded drawers of sturdy construction can be drafted for further service around the home. Hung on the wall and equipped with shelves, they make handy open cabinets for the kitchen, bathroom, nursery, or workshop. The deep narrow drawers of a kneehole desk often contain dadoes for removable plywood dividers that become ready-built shelves when the drawer is upended. With the knobs removed and the interior papered or painted in a contrasting color, a pair of drawers can be used, one on either side of a console, as decorative built-out niches for displaying interesting china or pewter heirlooms. The wide center drawer can be reinforced to hold kindling for the fireplace. Four wooden door stops can be screwed in for legs, or croquet balls can be cut in half and glued in place.

RADIO ALTERATIONS

Another dust collector in many a storeroom is that early radio cabinet and stand, which was acquired with so much pride and anticipation, only to be superseded by a later model. The imposing type illustrated in Figure 9.9 usually came equipped with legs or mounted on a stand. In either case the first operation is to remove the cabinet from its stand or the legs from the cabinet.

Occasional Table. In the type pictured, the stand is high enough to be converted into a table once it has been divorced from its top-heavy radio cabinet. Next the ornamental carvings are gently removed with a drawknife or file. Often it will be found that machine-made carvings have been glued on, which facilitates their removal. A thorough sanding with strips of emery cloth or a large dowel with sandpaper or emery cloth abrasive glued around it, will restore the simple lines of the legs and spreaders, which may be crossed, as in B.

The top can be of plywood or one taken from a discarded occasional table whose legs are too tortured for modern taste. It can be screwed to the aprons of the radio cabinet legs or fastened by means of any conventional metal devices.

Child's Desk. With a minimum amount of remodeling, many an old radio cabinet can be adapted to form a very satisfying desk for the young fry. The tall

type illustrated, through the addition of a fairly high base, will serve the teen-ager as a special homework desk in one corner of his or her bedroom.

In place of drawers, the radio panel is removed and a plain plywood flush door hinged to give access to a shelf extending the width of the cabinet, as pictured in C. The loudspeaker grill is removed to form a kneehole. If the latter is too

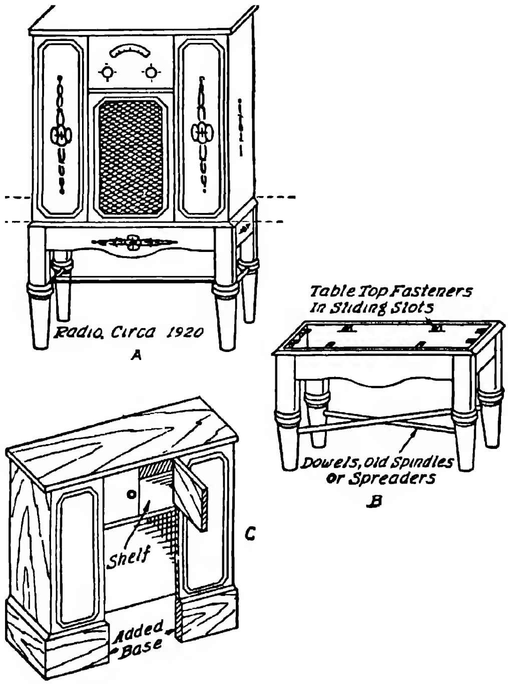


FIG. 9.9. Radio alterations.

narrow the top and back panel can be removed and replaced by wider material. In this case it will be necessary to replace the front molding under the edge of the top by a longer strip of similar pattern. The top can be covered by imitation leather, tacked underneath or along the front edge with brass roundheaded tacks.

Cellarette. Later models of cabinet radios were often constructed along simple lines from good cabinet woods. Once their radio and loud speaker units are removed, this type of cabinet makes an excellent carcass for a small cellarette.

The top is carefully removed so that it can later be hinged to the back of the cabinet, without overhang. Next a ½-in. or ¾-in. board is cut to fit inside the top of the cabinet, resting on narrow cleats 2 to 3 in. down from the top edges. depending upon the size of the glasses. Holes are cut in this board to suspend the glasses in place. Four large holes are cut in pairs at the two ends, for bottles. Two shelves must be placed about 10 in. below the large holes, to hold whatever

sized bottles are to be used, concealed behind the falsework on the sides of the cabinet. The size of the ice tub, cocktail shaker, and other paraphernalia will determine whether a half shelf can be installed across the interior for additional storage.

Flush plywood doors with outside surfaces that match the wood of the cabinet are hinged to the front opening. If matching hardwood plywood is not available, ordinary smooth stock can be lacquered and covered with the lacquer film decalcomania described in Chapter 5.

The hinged top is held upright by brackets at either end, and can be lined with a mirror cemented in place by MMM or with a piece of chromium or copper. The inner faces of the doors and the interior storage space can be enameled or lacquer-sprayed with a warm, contrasting color.

SEWING CABINET REMODELING

Prior to their unobtrusive concealment in various end tables and bedside stands, sewing cabinets made no pretense of their primary mission in the life of a busy housewife. Even today, the compact Priscilla type retains favor in many a home, whereas a blatantly panniered contraption known as the Martha Washington Sewing Cabinet has vanished "up attic." Seldom mishandled, this space consuming cabinet was eventually banished because of its inability to assume an identity other than that for which it was intended.

When the porch was turned into an outdoor living room, or an open terrace was added to the sunny side of the house, more than one housewife discovered that she was endowed with a "green thumb." With a minimum of care, pots of ivy and cactus, as well as the ever-popular geraniums thrive under indoor horticulture, provided their location insures the necessary sunlight and facilities for easy watering. These twin requirements often obviate the more decorative positions because of shifting sunlight and the possible danger from drippings. One interesting method is to "plant" a layer of pots in the half-open drawer of a sunlit table. Another is to provide built-in metal receptacles in the table top, as in the flower table described in Chapter 3.

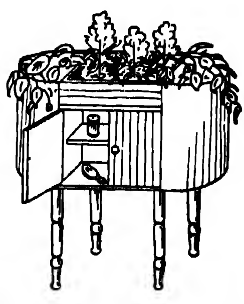


FIG. 9.10. Sewing cabinet remodeling.

This brings us to the paunchy little sewing cabinet in Figure 9.10 as a project for conversion into an indoor plant stand. Obviously the two side compartments will be suitable for plant holders. To attempt to amputate them would cause considerable cabinetwork; the most practical procedure is to remove their tops, and after cutting them down to fit inside the two side compartments, cleat them into place at whatever depth is desired. The resulting plant wells can then be lined with zinc or galvanized iron pans, soldered or folded together in the manner

previously described. The remainder of the top is then removed, and the top drawer is fastened firmly in place, its knobs detached, and a metal liner provided.

Since the lower two (or three) drawers are usually too shallow for storing indoor gardening paraphernalia, they and their rails should be removed. This leaves a good-sized compartment, which can be closed by hinged doors, constructed from the center section of the cabinet top. A half shelf can be added for flowerpots, nitrates, and other plant foods, with space below for trowels, forks, scissors, and gloves.

The center top compartment, reconstructed from the top drawer, can be filled with sand for the cactus fancier, or may be converted into a miniature cold frame for the outdoor garden enthusiast. In the latter case, one of the discarded drawers can be sawed in half, with a pane of glass substituted for the rabbeted plywood bottom. Before this frame is hinged in place, its edges can be rabbeted to fit rabbets cut in the top edges of the center drawer compartment, and the glass thoroughly puttied around the edges.

The "tank farmer" will prefer to fit a waterlight metal liner into the center, or all three compartments, with a wire mesh covering for the moss that holds the plants above their hydroponic root feed. In any event, a good undercoater followed by glossy enamel finish will soil less easily than a flat painted finish. Clear spar varnish should be applied if the plant stand is to remain long outdoors.

WASHSTAND TRANSFORMATION

Back in the days when plumbing was still a luxury, every room had its washstand, complete with a decorated china wash bowl, pitcher, and built-in towel rack. Usually these stands were part of bedroom suites, finished in bird's-eye maple, walnut, mahogany, or oak. Often well built, they customarily had a top drawer the width of the stand, with a cupboard below as shown in the drawing

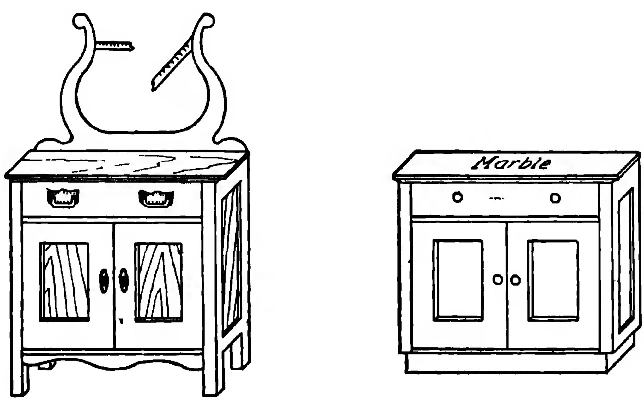


Fig. 9.11. Waterstand transformation.

(Figure 9.11); or the lower space was divided between a narrow cupboard and two small side drawers.

Unless the styling of such a piece requires serious remodeling, all that is usually necessary to put it back into circulation is to unscrew or gently "rock" out the arms which hold the towel bar, insert one or more shelves inside the cupboard, and refinish the piece as a small buffet. The shape and length of the legs will determine whether they should be cut off or hidden behind a base molding. Old-fashioned marble tops are now in style again and, because they are stainproof, will render valuable service.

When closing in an "expansion attic" it would be worth while to collect as many of these old washstands as can be obtained for a reasonable price. Quite often it will be found that their height is just right for building-in under the eaves The same is true of built-in sectional furniture or for use in storage walls. Many washstands made of quarter-sawed golden oak were apparently constructed from a common pattern, so that when painted and equipped with a solid base, they will give the appearance of custom-built sectional or built-in furniture.

SIDEBOARD METAMORPHOSES

The massive long sideboards of bygone days are difficult subjects for conversion into anything that will harmonize with modern trends. The more ornate (A, Fig. 9.12), the lines the less possible it is to streamline them. In fact the best treatment seems to apply paint in bright peacock, dark green, French gray or even black, high-lighting the ornamentation with gilt or a contrasting color, to match the chairs and table which have been similarly treated.

As a built-in feature, use can often be found for the many drawers and the cupboards of an old-fashioned sideboard. This is particularly true of a built-in bar, where the sideboard with its mirror can be utilized to good advantage as a bar back. For corner bars, a pair of matching sideboards, one on each side, will produce a professional background, furnishing handy counters and shelves for glasses, as well as acceptable storage space for bar implements and bottled goods. Under these conditions a lively color should be used to accent their sedate restraint, with hilarious peasant painting or stenciling allowed considerable freedom.

Mission-type Conversion. That sturdy rectangular sideboard or buffet that often remains in service in the workshop because of its handy storage space can be modernized to perform its original function, once it has been subjected to simple face-lifting operations.

Using the type shown in B of Figure 9.12 as an example, the carcass is completely gutted of doors, drawers, and rails, and its legs amputated to a height of 4 in. For the modern touch, small wooden insets are added to give the front legs a tapered effect; the back legs can be similarly treated as desired. The open front of the carcass is then fitted with two flush panel doors with Weldtex or hardwood plywood surfaces, or with two stuck panel doors, if preferred. An

optional method is to cut out two ¼-in. plywood panels to fit the opening, and cover them with an interesting material that picks up a primary decorative motif of the room, such as chintz, wallpaper, or rug pattern. Thin mitered stock 2½ or 3 in. wide can be fastened over the covered plywood panels to simulate dadoed

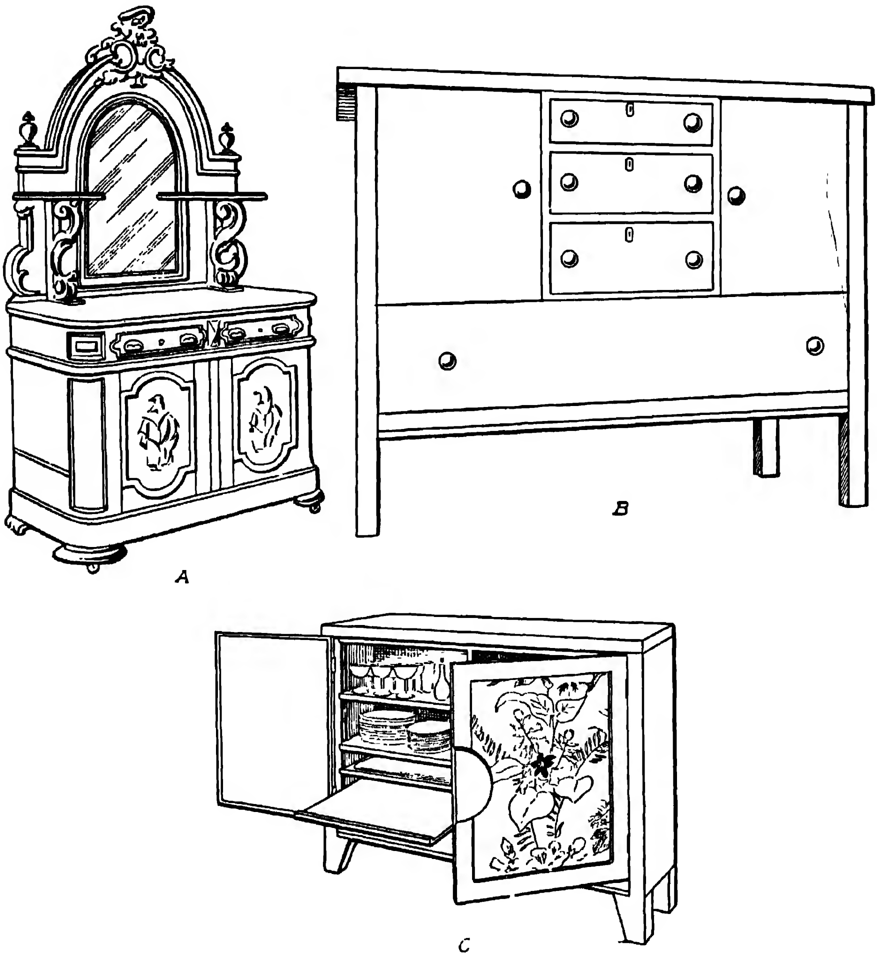


FIG. 9.12. Sideboard metamorphoses.

construction. The finished doors are then butt-hinged so that their front surfaces are flush with the sides of the buffet. Modern door knobs are added before the paint, lacquer, or enamel finish is applied.

To replace the drawers and cupboards that were removed for the alteration, shelves can be cleated into place in positions that will accurately accommodate

the actual dishes and linens to be stored. Any or all of the shelves can be constructed to slide out, with a semi- or full back to insure retention of their contents when they are pulled out.

REVAMPING A DRESSING TABLE

Kneehole Desk. The veneered vanity of not-so-long-ago, with its waist-high central mirrior and low shelf between two higher, narrow drawer sections, can be converted to a small bedroom version of a kneehole desk with but little effort on the part of the home furniture adaptor.

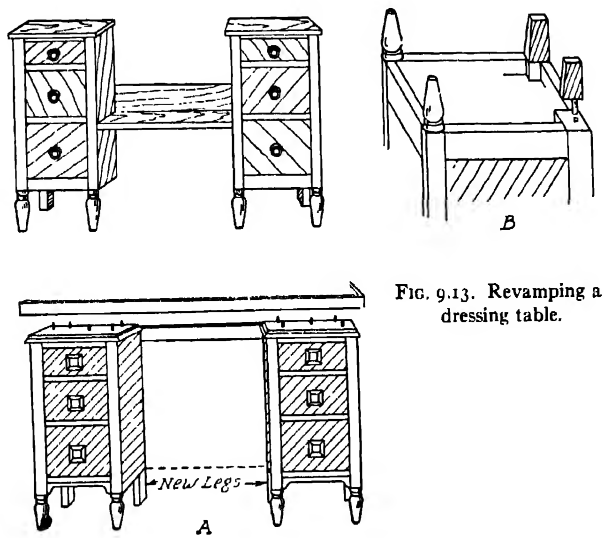


FIG. 9.13. Revamping a dressing table.

If the drawer compartments are in fairly good condition, the middle shelf and its backing can be removed, thus liberating the three- legged drawer compartments. To unite them into a single unit, the simplest method is to screw a sheet of ½-in. plywood to the backs of both cabinets, extending up from the dotted line in A of Figure 9.13, beyond and in place of the upper rear rail indicated in the drawing. The plywood panel should be long enough to permit a kneehole at least 18 in. wide, extending to within 3⁄16 or ¼ in. of the outer edges of the outer rear uprights; it is screwed securely to all four uprights. With a full plywood back of this type, only the two outer rear legs will be required, and all that remains is to screw a suitable top across the tops of the two drawer compartments.

For a more delicate job, where it is not anticipated that the desk is to be subjected to much moving about, the plywood back can be omitted, and a rear upper rail screwed across the backs of the drawer sections, under the rear over-

hang of their tops. This type of remodeling will require the addition of inside rear legs, if the vanity is of the type shown in the first drawing. A block or blocks can be inset in the vacant corner of the bottom, as shown in detail B, and a matching leg doweled into place flush with the outer corner.

Commodes. If a pair of matching nightstands for the bed are of more immediate use than a kneehole desk, the addition of the extra legs to the separated drawer sections will complete the job, except for finishing. Modern drawer pulls can be substituted for the older hardware, and the legs cut down if the tops are found too high for bedside use.

BED-IN-CHEST

An old chest of drawers, dresser, or low chiffionier whose top stands 40 or more inches above the floor, and whose drawers and slides have become so warped as to be useless, or whose drawer fronts and rails have parted company from their supporting pieces, can be resurrected to house a foldaway bed, after a bit of elementary cabinetwork has been performed.

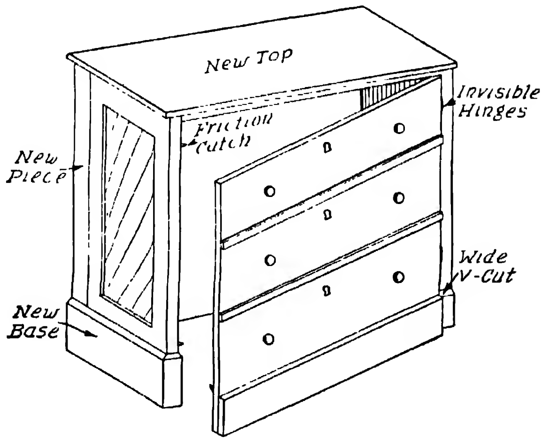


Fig. 9.14. Bed in chest.

The minimum dimensions of this type of bed, when folded, are about 40½ in. high, 30 in. wide, and 18 in. deep. Heights vary up to 43 in., with widths of 39 in. and 48 in., and depth up to 25 in. Not many old chests are 18 in. deep over-all; a 30-in. width is common, however. Therefore, one of the first requirements will be to deepen the average available chest, and probably to increase its height.

The first operation is to remove all drawers, slides, guides, and rails. This may necessitate sawing through the ornamental front base if there is one. Unless the chest or dresser is deep enough to house an 18-in. foldaway bed and mattress

inside, with allowance for a ¾-in. thick front door, the back will have to be removed.

Next the height must be checked and probably increased to give clearance to the bed when it is folded inside the chest. This is best accomplished by later adding a base of sufficient height to the outside bottom end, of the sides. When the side rails are relatively wide, the added basepieces should be mitered at the outside front corners to short frontpieces that end flush with the inner edges of the uprights, as shown in Figure 9.14. The upper edge of this added base can be beveled or finished off with a narrow molding.

With the height determined, a front door can now be constructed, whose outer surface is made up to look like the series of drawer fronts, knobs, escutcheon plates and rails of the original chest. This is not difficult when a ¾ in. sheet of plywood, cut to fit accurately in the front opening, is used as a foundation. Wood strips ⅛ or 3/16 in. thick are cut as wide as the original rails and glued or bradded horizontally across the front of the door at the proper intervals. With the original or selected drawer knobs and escutcheon plates fastened in place the result is a false front whose drawers have been pushed slightly back from their rails. This is a more economical method than gluing on pieces of veneer the size of drawer fronts to overshadow their pseudo rails. The door can then be hinged in place with a narrow cleat to act as a stop on the opposite side. Friction catches will hold it shut, and any of the knobs or pulls can be used to open it.

With the front door in place, it is now possible to calculate accurately the interior space. In most cases this will require widening both the sides and top. If the finish is to be paint or enamel, any suitable stock can be doweled in place or attached from the inside by flat mending plates. Otherwise the wood must be matched. Before the back is attached, it will be well to reinforce the top with heavy angle irons, unless the joints are tight.

The base is then attached, with a section for the front door. Care must be exercised that no rugs intervene to block the opening of the door, which can be cut out slightly in the center, if desired. A plywood back completes the job, all but the finish.

BUREAU REFORMATION

Another treatment for a dilapidated low chest or bureau, whose drawers are no longer usable, is to construct a fixed false drawer front, hinge the top and line it with cedar, as pictured in Figure 9.15. Properly finished this concealed cedar chest can take its place unobtrusively in the living room as an interesting lowboy.

If the original chest or bureau appears to be too high to function as a cedar chest, it can be cut off below the top drawer or drawers, just above the drawer rail. Next the slides, guides, and drawer rails are removed and a bottom of ½ in. boards is fastened to cleats replacing the flimsy dust frame. In all probability it will be decided that the back is also too thin to support the cedar lining, in which case it too must be replaced with boards.

The front can be constructed as described for the bed-in-chest, or if the drawer fronts and rails are still presentable, they can be removed from the carcass, fastened to a thin sheet of plywood from the inside, and replaced against cleats in the front.

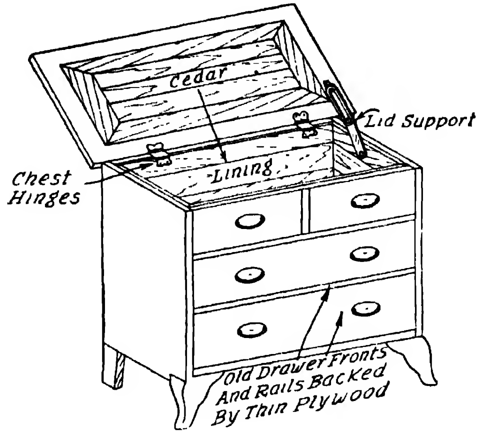


FIG. 9.15. Bureau reformation

If the top originally had an overhang at the back that is not taken up by the new backing, it must be sawed off flush, so that butt hinges can be screwed in place. A lock, if inserted, should be deep enough to coincide roughly with the old position of the original escutcheon plate of the top drawer front. The tongue and groove cedar lining is installed in the manner explained under chests in Chapter 3.

MODERNIZING OLD BEDS

The so-called Hollywood styling in beds has not only lowered the springs of the average bed, but has entirely eliminated the footboard. The headboards are upholstered in a variety of materials from leatherette to zebra skins, and take on a diversity of silhouettes, from strictly rectangular to an ornate series of curves.

If the springs and mattress of a conventional bed are in good condition, conversion to the streamlined Hollywood type is not too difficult for the home mechanic. Since the footboard is to be removed, it will be necessary to box the springs, either by upholstering them in a casing of varicolored bed ticking, tacked to a flat wooden frame under the metal framework of the springs, or by constructing a wooden box to contain them. If the former method is preferred, it will be necessary to construct an underframework of hardwood to which the bottom of the metal framework of the springs can be attached, either by drilling for bolts or rivets, or by means of suitably placed angle irons. The wooden framework is then available as a base to which a cotton-duck foundation can be tacked, covered

in turn by two or more layers of felted cotton, and held tightly in place by a casing of standard mattress ticking. A cambric or muslin backing is then tacked to the underside of the wooden frame as a dust seal.

In order to eliminate upholstering, the springs can be literally "boxed" by a framework of ¾-in. lumber, 7¾ in. or more in width, as shown in A of Figure 9.16. Unless the lumber is 12 or more inches in width, front and side stub legs will be required. The headboard should have the two rear legs built into it.

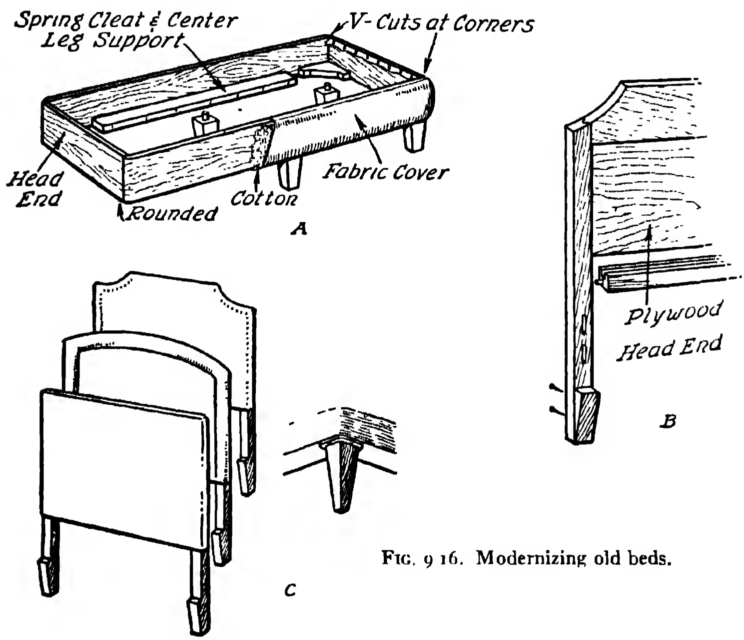


Fig. 9.16. Modernizing old beds.

As will be noted in detail A, the box frame can be butt-jointed, with its ends jack-planed, filed, and sanded into rounded corners. Cleats are screwed into the lower inside edges to hold the springs, after the corner blocks have been glued and screwed into place. Both the front corner blocks and the cleats should be wide and thick enough to accommodate ⅞-in. dowels or tenons to hold the four stub legs firmly in place.

The front and sides of the box frame can then be padded with a layer of cotton and covered by whatever material is selected for the headboard. The front corners are turned by means of tabs formed by V cuts on the inside. Tacks hold the top and bottom edges of the coverlng material to the inside of the frame.

In the dusty corner of many an attic, there lies an old wooden headboard in a paneled form, which can be easily upholstered inside the rails and uprights. For a curved effect, the headboard can be cut from ¾-in. plywood with the rear

legs mortised into the sides, or it can be built up into the stuck panel frame indicated in detail B. The shape will vary according to individual preference; detail C shows a conservative selection.

Whatever the choice of material and treatment for the headboard covering, a backing of cotton padding will be required on the front. Whether in a quilted effect, with upholsterers' tacks driven in at geometrical intervals, a plain effect, or puffed or corded treatment of the edges, as indicated in C, the front material can be tacked to the back and covered by a cemented piece of the same material, or for economy's sake, by a piece of denim. Curves are covered smoothly by cutting tabs at the back. After a fitting, the tabs should be cut with deep enough V grooves to prevent undue overlapping.

As discussed in Chapter 2, the higher the bed the easier the bedmaking. The average depth of new springs is 8 in. and of mattresses, about 6 in. The mattress should clear the boxed spring so that it can be periodically turned with ease. The height of the headboard should not exceed 42 in., and if left at 31½ in. will fit in with the sectional chests described in Chapter 2 (page 140). Tall headboards can be constructed to fit into, or in front of compartment headboard panels.

AUTO SEAT ADAPTATIONS

Indoors. Although it may be a moot question whether old automobile seat cushions come under the heading of discarded furniture, it is nevertheless true that they can be converted into very comfortable household seats with a minimum of effort. If their cushioned springs remain in usable condition, they are ideal as built-in benches in the basement playroom, in fact, the more the merrier. Fitted into wooden frames against the wall, two or more auto cushion seats, when built around a corner with a lamp stand and shelf filling up the vacant corner space, are vastly superior to padded benches. Bright slip covers will solve the upholstery problem, if it is not considered feasible to do a complete recovering job with a colorful leatherette or waterproof fabric. In building a simple frame to hold the back and seat springs sufficient rake should be provided to the back, in combination with a fairly deep rearward slant in the seat, to insure a comfortable lounging angle.

Outdoors. An interesting treatment of an old auto seat for outdoor use involves the use of a pair of wagon wheels as side supports. As shown in Figure 9.17, after the steel rims are removed, the wooden wheels are cut near the ends of the lowest horizontal spokes to leave the hubs intact. Four hardwood rails about 1½ in. square and as long as the auto cushions are screwed to the rims and spokes as shown. Small angle irons should be added to reinforce the screws driven into end grain, thus preventing later spreading.

If only one wheel is available it should be sawed midway through its hub, and each half mounted on a 1⅛-in. base, 2½ or 3 in. wide, by means of bent

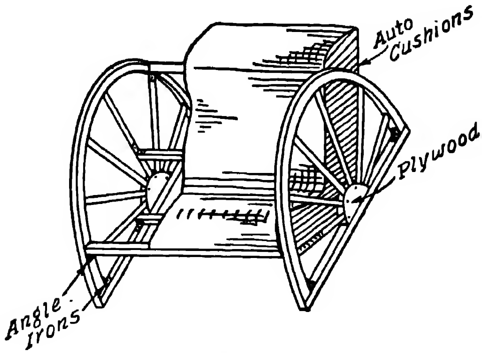


FIG. 9.17. Wagon wheel settee.

angle irons. The hub openings can be closed by means of plywood disks. Spar varnish will render excellent weatherproofing service as a finish.

ANOTHER WAGON WHEEL

For the country home or camp, another heavy wagon wheel of medium diameter can be sawed in half across the hub to form a pair of rural headboards for old

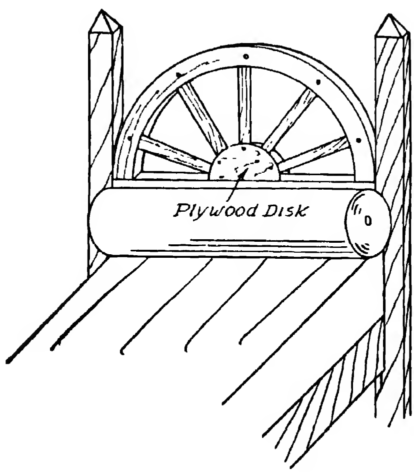


FIG. 9.18. Wagon wheel headboard.

twin-sized beds, of simple lines. As shown in Figure 9.18, the half hubs are covered by plywood disks bolted into place, and the rims are bolted partway up the heavy bed posts.

If no suitable beds are at hand, frames can be constructed to fit the available

wagon wheel. The simpler and more rugged the construction, the more it will harmonize with the novel headboards. The latter should be taken down to the bare wood and both posts and wheels stained to match. A dark golden brown tint makes a suitable finish that will blend with the rustic nature of the construction.

AFTERTHOUGHTS

As was emphasized in the introduction of this chapter, "adaptamania" should not be pursued beyond the bounds of good taste and common sense. If, after a critical scrutiny, a piece of dilapidated or old-fashioned furniture does not offer reasonable possibilities for redemption, it should be consigned to the junk heap or dismembered. Although paint has the magical quality of subduing pretentious designs, it cannot eliminate basic ugliness or obliterate innate vulgarity.

For the parent who is an enthusiastic furniture converter it is suggested that a good proportion of available discarded furniture can be reduced to tot-size, by employing the most elementary woodworking techniques. This lilliputian furniture, when painted to match whatever room has been set aside as playroom or nursery, will well repay the slight effort required to render it serviceable for the young fry.

In conclusion, it can only be hoped that the generalizations included in this chapter may offer suggestions that will sharpen the imagination of the amateur adaptor and whet his ingenuity.

10

PRINCIPLES OF INTERIOR DECORATION

BY

MARION INGALLS PELTON

Former Instructor, New York School of Decoration

THE purpose of interior decoration is to make a home of a house or an apartment. This means the creation of an atmosphere of ease and restfulness, stamped with the owner's personality. Successful decoration involves a series of common-sense interpretations of comfort, beauty, and ease of maintenance, to the end that the living habits of the individual or the family may best be served. This is equally true of the all-purpose one-room apartment, a cottage or a large establishment, regardless of the size of the available budget.

Necessarily, it is the size of the budget that will exercise a potent influence over the degree of decoration and the number of accessories which will be available. While it is true that a comfortable budget will permit more flexibility of plan, a limited budget is insufficient excuse for the continued existence of an unattractive, disorganized, or unhappy background. There is no budget so small that it cannot materially aid the decoration of a single room. Even as Rome was not built in a day, so the decoration of a home proceeds room by room, often consuming an appreciable period of time. For the resourceful homemaker who is unafraid of perspiration and paint, the problem of "budget" decorating is not insurmountable, when coupled with patient, consistent purchasing for replacement or improvement at carefully planned intervals. The financial arrangement for any decorative scheme should be carefully planned, be very definite, and then strictly adhered to.

In view of the variance of opinions among professional decorators, it is apparent that good taste is not confined to the narrow limits that many people have been led to believe. The "art" of interior decorating is no longer the mysterious, expensive plaything of the wealthy that it was believed to be only a few short years

ago. It is now understood to be what it is, merely a carefully organized planning of the interior of a home, from its background to the last detail in accessories. While it is true that there are certain generalized standards of good design, it is nevertheless important that decoration be closely related to human needs and preferences, and not permitted to yield to professional fads or to the current whims of "stylists." The surest way to succeed in it is to remember that the final test

Courtesy John Wanamaker

FIG. 10.1. Woodwork toned to walls.

of a good decorating plan is the complete satisfaction of those who live with it. The proper attitude might be summed up in the present-day admonition: "It's your home, make it comfortable."

The element of interior space is determined by two factors; (1) conditions that already exist; (2) conditions that can be made to exist. By this is meant, whether the house or apartment is already built, or is in the process of construction. In the latter case the prospective owner of a cooperative apartment in an urban center may in many cases exert considerable control over various aspects of the floor plans; the prospective homeowner has automatic control of the house plans within the limits of his self-imposed budget. The location and placement of windows, doors, wall areas, fireplaces, and built-in conveniences from both a utilitarian and a decorative standpoint are of primary importance during the

planning and construction stage. That is the time to locate the focal fireplace, the effective picture window, and above all, adequate storage space. With construction completed, decoration must make the most of what there is, counteracting architectural faults if they exist.

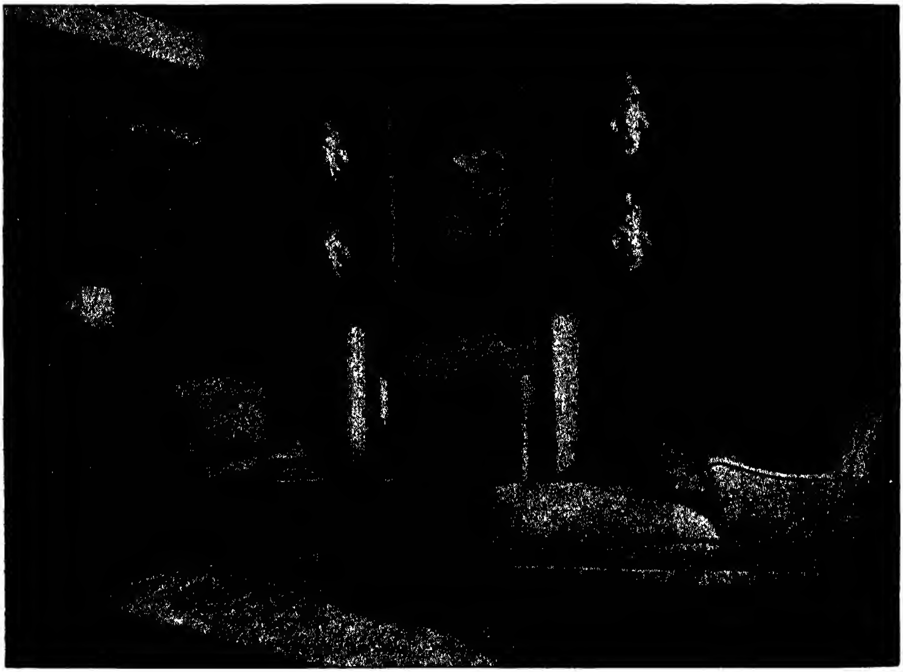
Courtesy James McCreery & Co.

FIG. 10.2. Basement apartment.

Given a floor, four walls, and a ceiling, or a series of these rooms or "units," the tangible tools of the interior decorator are the background, furnishings, and accessories. The coordinated plan must take into consideration the diverse elements of wall and ceiling treatment, window accessories, floor coverings, visible heating equipment, furniture and recreational conveniences, and lighting fixtures and lamps —all must enter into the long-range decorating plan. The budget will control the initial amount that any plan can realize, but plan there must be. This will prevent haphazard backgrounds, or the acquisition of furnishings that may not harmonize with the finished room.

Optical Illusions. There are a few general suggestions that apply to almost any decorative scheme, which it is well to consider at this point. In these days of smaller houses and apartments, a frequent problem is that of creating a feeling

of spaciousness in small rooms. In some cases the opposite effect may be the immediate goal, for example, when it is desired to make a narrow room seem wider, or a high ceiling lower. To accomplish these effects the resourceful decorator makes free use of elementary optical illusions, purposely suggesting to the eyes of the beholder an effect which is at variance with that which actually exists. In



Courtesy American Furniture Mart

FIG. 10.3. Use of stripes.

order to achieve such results, undesirable, arresting effects are toned down, and the eyes *guided* to what they are supposed to see. For example, it has become customary in recent years to paint or stain all woodwork such as doors, door and window trim, and baseboards the same general color as the walls (Figure 10.1), or a shade that blends with their coverings, thus removing the eye-arresting, cut-up appearance so prevalent at the turn of the century. Again, a small pattern in the wallpaper of a small room will by the frequency of its repetition suggest spaciousness, as in the one-room, basement apartment photographed in Figure 10.2. If stripes are used they should be kept narrow, as in Figure 10.3, and the number and sizes of pictures held to a minimum. A pleasing modern treatment is to paper or panel one or two walls only, painting or tinting the remaining walls in harmony, as is suggested by the bedroom walls in Figure 10.4. This is particularly effective in a long, narrow room where the narrow ends are made to seem

wider and nearer when covered by a small-figured design. Ceilings always seem higher when light colored, even more so when they are "dropped" by carrying the light shade a short way down the tops of the side walls. Another modern device for shearing off space from a long narrow room has already been discussed in Chapter 4 under the heading of valances. Figure 10.5 shows the corner of a

Courtesy Gimbel Brothers

FIG. 10.4. Contrasting walls with a chintz panel.

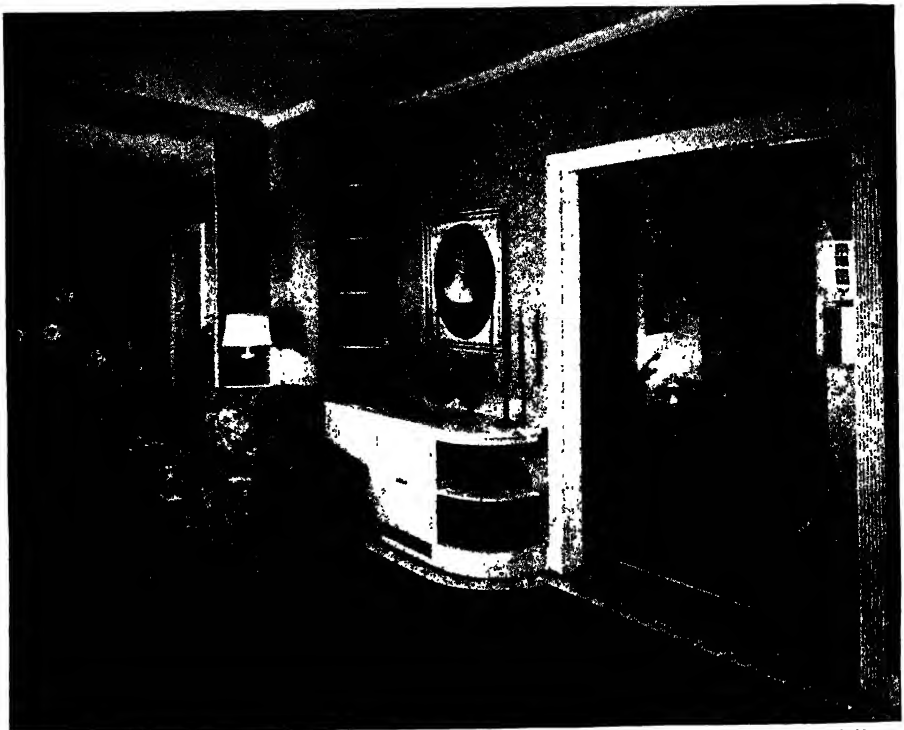
remodeled living room from which a comfortable dining alcove has been effectively carved by the use of drapes sliding between long, double ceiling valances.

One of the most powerful illusions of spaciousness available to the home decorator is that which derives from the skillful location of plate-glass mirrors. The extreme transformation pictured in A and B of Figure 10.6 seems to verge on necromancy, making use, as it does, of but a single large mirror. Distinguished effects can also be obtained by cutting the mirrors to fit the wall openings, such as the fireplace in Figure 10.7, or using smaller, rectangular mirrors in the form of paneling, as in Figure 10.8.

Type. One of the first decisions confronting the home decorator is the choice of the type of furnishings. There should always be a definite motive behind such a decision, which is frequently determined, for a house, by the architectural exterior. Exterior types can be briefly generalized as Colonial, Georgian (formal

Colonial), English, Regency, French, Italian, Spanish, Modern, and Nondescript. A pronounced type of architecture usually supplies an unmistakable motive for the interior furnishings.

In a newly built house the owner's choice is more or less unrestricted, and the inevitable selection between modern and traditional furnishings is inescapable.



Courtesy U.S. Gypsum Remodel Research House

FIG. 10.5. Valance room divider.

Here again the choice should be determined by what the occupants like and want to live with. Furnishings, even more so than clothes, should be carefully selected with an eye to their permanence. They must be lived with day after day, and unlike clothes, the scheme of decoration cannot be discarded or replaced, inexpensively or at will. A firm plan must be evolved, based on environment and the likes and dislikes of those who are to live with it.

Modern. As an aid to decision, some of the advantages of both modern and traditional furnishings are suggested. Under the heading of modern there will be noted a simplicity of form that is a distinct aid in housekeeping maintenance, as will be noted in the absence of carvings, scrollwork, or other dust-catching gingerbread in the modern living room pictured in Figure 10.9. Partitional or sectional

bookcases, cabinets, and couches (Figure 10.10) permit extreme flexibility and are in general better scaled to modern living. Once accepted, modern furnishings have a lasting style, capable of augmentation from time to time without a clashing of individual units.

Traditional. Whether they are authentic pieces or good reproductions, traditional furnishings, on the other hand, arouse a more homelike feeling in the majority of us because they are more familiar. Naturally traditional furnishings are more harmonious in a traditional house, and when authentic furnishings are

Photograph Courtesy Libbey-Owens-Ford Glass Co.

FIG. 10.6. Living room, "before" and "after."

selected, there is no risk in judgement. The home decorator whose taste and judgement are sure, however, can successfully blend desirable elements of more than one type. Some of the most successful effects are obtained by decorators whose strength of character has prevented stereotyped results, because they have not hesitated to take liberties with their selection of furnishings in their determination to display their own individualities in their own homes.

Backgrounds. For each type there is a different style of background which should present the same characteristics as the type to which it belongs. The matter of background should receive careful consideration, since it represents the first and most important decorating decision. It has been truly said that distinction and individuality can be built into any room that has four walls; therefore, once the type has been selected, the next step is to determine and assemble the background suitable to it. If the walls, woodwork, and floor are not in harmony with the selected type, the most expensive furnishings cannot right it. Conversely a limited budget and careful planning can produce astonishingly harmonious results.

In order to avoid being rushed into rash decisions, it is an excellent idea to keep a scrapbook of appealing ideas culled from books, magazines, and newspapers.

A few examples will suffice to explain what is meant by harmony between type and background. In the Colonial house the walls may be papered with a Colonial reproduction, or finished in chalk white, ivory, apple green, pine, or any mellow

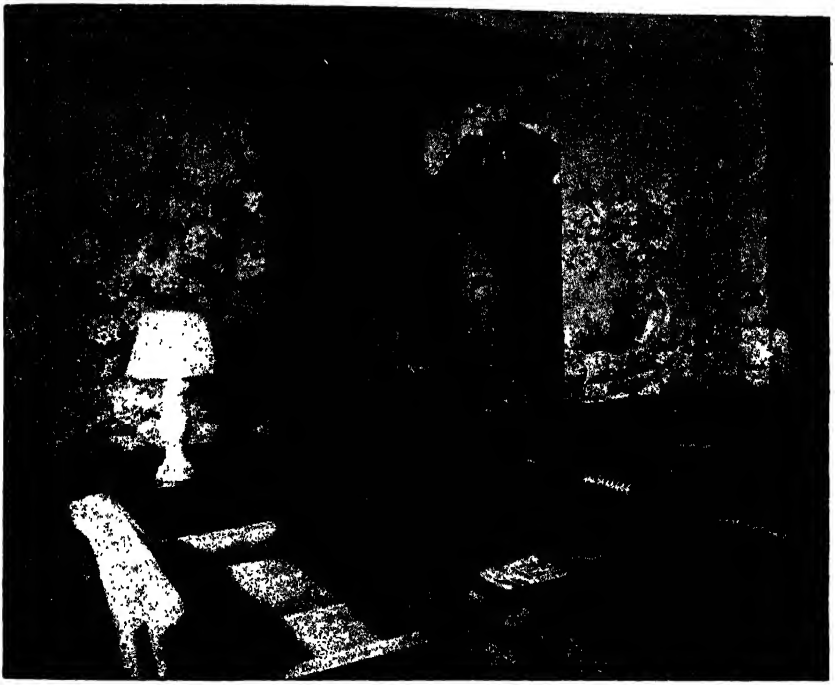
Courtsey W. & J. Sloane

Fig. 10 7. Mirrored fireplace background.

background in traditional shades. An English home would have rough plastered walls, possibly painted, and dark woodwork. A Spanish house in the South or Southwest would be expected to display walls of much rougher plaster, with tiled floors predominating. French homes usually exhibit waxed, paneled walls, or soft gray, green, or blue tones. Contemporary homes offer the greatest opportunities for the expression of individuality, provided the effect attained is neither harsh, inharmonious, nor uncomfortable.

Before considering other elements of interior decoration, it would be well to examine some of the by-products of this quality of individuality or distinction. It is possible that the individual's unconscious formality may dictate an austerity

in the character of the furnishings that is quite opposite to the intended result. Where formal dining, for example, is routine rather than exceptional, cool walls and the elimination of accessories may well reflect the desired feeling, as in the traditional dining room photographed in Figure 10.11. If on the other hand, it is the intention to express a warm hospitality at the very entrance hall of the home,



Courtesy American Furniture Mart

FIG. 10.8. Mirrors as paneling.

then every effort should be made to warm up such an entry. An interesting picture or two, soft mellow lights, a bowl of flowers, gay chintzes or comfortable chairs go far toward suggesting a welcome and dispelling the chill of austerity. Although orderliness is a desirable quality in design and decoration, a scarcity of furnishings and overemphasis on orderliness is apt to create a feeling of inhospitable reticence.

Color. Closely allied to background is the decorator's most important tool, color. Color alone can create the atmosphere of a room, rendering it warm or cool, gay or quiet, interesting or dull. It is also a dependable accomplice in the art of illusion, making small rooms seem larger, dark rooms lighter, underemphasizing architectural defects, and accentuating points of interest. Books have been written on the subject, which can be only briefly outlined here in the hope of

presenting color as the decorator's friend, rather than as a baffling bogey to be distrusted.

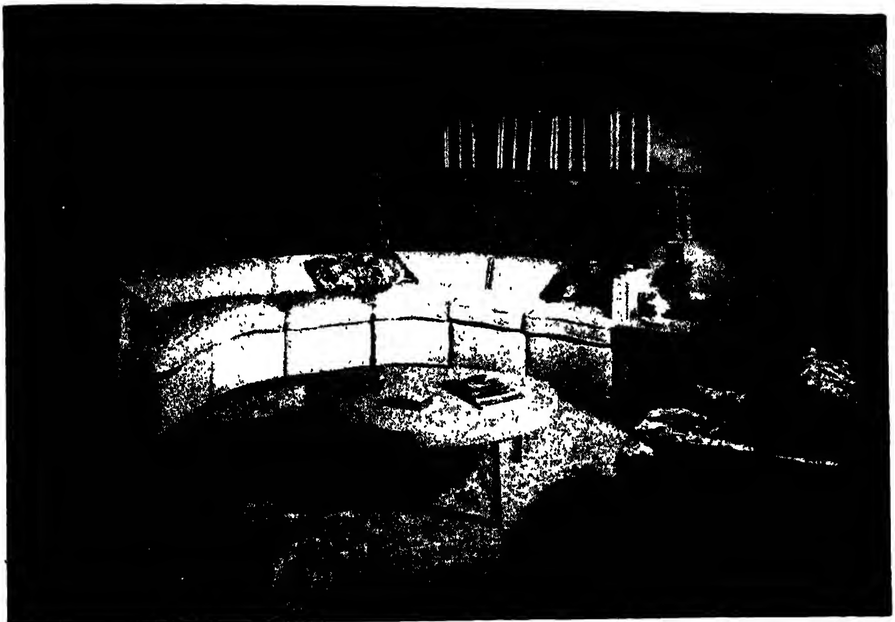
Because of the importance of color in the decorating scheme it is deemed advisable to elaborate some of the points which were briefly touched upon in Chapter 5. In the first place, it must be remembered that the two fundamental

Courtesy B. Altman & Co.

FIG. 10.9. Modern living room.

characteristics of color are *intensity* and *value*. By intensity is meant the degree of purity or strength of a color as distinguished from its grayness or softness; the value of a color depends upon its lightness or darkness. Both intensity and value exist in all colors at the same time. For example, buff is a light-grayed yellow, while vermilion is a pure, medium-value red. In recollecting colors that have produced the greatest appeal, it will usually be recalled that the majority presented a grayed (French) soft value, conveying a feeling of restfulness. The strong colors are generally too harsh for everyday companionship, although the men of the family often prefer them, with emphasis on the reds. Unless the decorator is very color perceptive and keenly aware of the nuances that can be

achieved by the interrelationship of the tones and value of the background with those of previously selected furnishings and accessories, the safe rule to follow is to be sure that soft colors predominate in the background, whether it is painted or papered. Cream, (French) gray, putty, pale green, mauve pink, and the gray blues are justly popular for their restful characteristics. In planning any color scheme the main rule to remember is that any combination of colors which have



Courtesy B. Altman & Co.

FIG. 10.10. Sectional circular couch.

the same *tonal* value will not clash. Thus, if it is intended to use a combination of blue, green and rose in one room, though colors should be held down to a grayed shade, or left bright, they must be of the same tonal value or there will be discord.

Harmony is achieved by a close relationship between walls, woodwork, and floors, which become the background for the scheme of decoration. Woodwork should either match the walls, or be of a slightly darker or lighter shade of the same color. Ceilings in general should be cream, or a lighter value of the wall color. Floors in a formal room look best when carpeted from wall to wall, otherwise they should be treated with a dark finish as a background for the room color. Old pine, oak, or chestnut floors are scraped to the grain and waxed, to bring out the beauties of the natural wood. In general, the decorator who remains aware of nature's effects cannot fail of success. The brown earth affords the

darkest floor tones; the walls, perhaps of bluish-green, represent the crispness of outdoor vegetation, cream or pale ceiling is the sky, lightest of all.

The small house will seem larger if a background of one color is used throughout the majority of rooms, instead of the kaleidoscopic effect that results from the indiscriminate use of different colors. Variety can be secured by using different intensities and values. This is one of the secrets in the successful use of color,

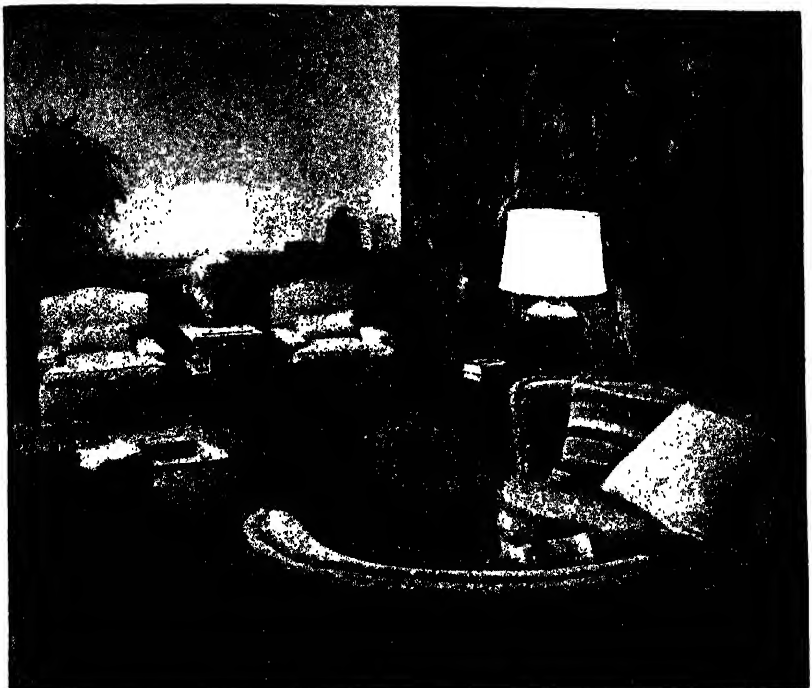
Courtesy W. & J. Sloane

Fig. 10.11. Traditional dining room.

the balancing of different intensities and values in the same or similar rooms. This does not mean that a room should be toned down tō the point of colorlessness, or have its predominant areas of so strong or harsh a color as to be harsh and unlivable. Most successful color schemes make use of from three to four colors, at least one of which is neutral.

These colors cannot all be in the background, even though there is a differentiation between floor, woodwork, walls and ceiling. The furnishings and accessories definitely enter into the decorating scheme, in fact so much so that many effective plans derive their unity from a single piece of tapestry, as in Figure 10.12, an important upholstered chair or couch, an unusual section of chintz, or a rare

vase of exquisite color. One of New York's leading decorators who is an expert in color, once did a charming drawing room based on the colors of a Chinese *cope* (cape) which was used as a wall hanging, much as the tapestry in the photograph. The fact that the predominate colors were salmon, turquoise blue, and purple may sound fantastic, but a thoughtful study of the color wheel in Chapter 5 (page 338) will indicate why the room was beautiful.



Courtesy Bloomingdale Brothers, Inc.

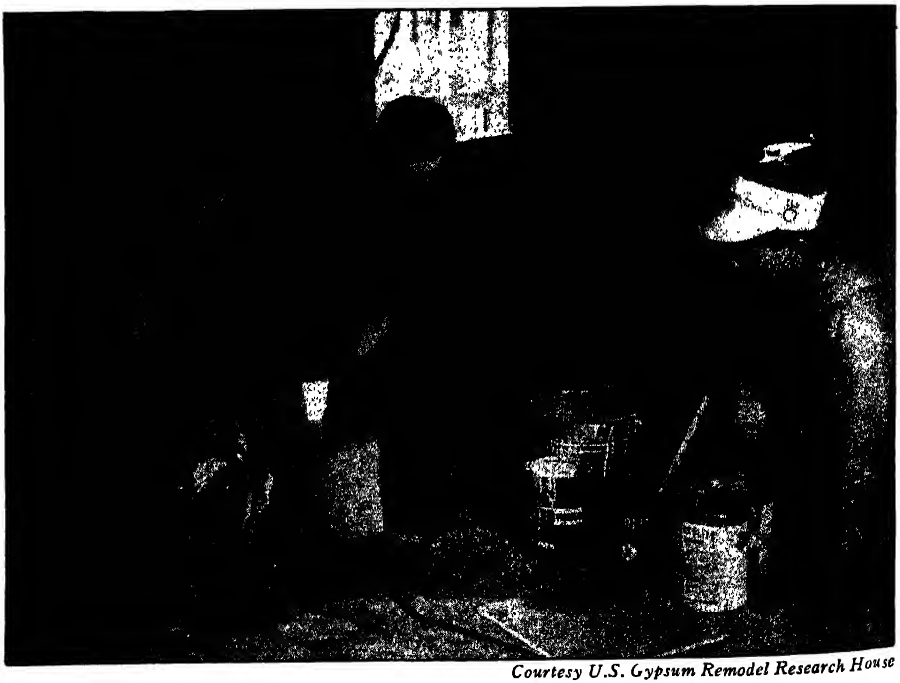
FIG. 10.12. Tapestry as a focal point for color.

A room done in soft colors only, no matter how varied in value or even intensity, is apt to appear weak and uninteresting unless there is a pattern somewhere. Vivid colors in such a room can be supplied by draperies, upholstery, screens (Figure 10.7), pillows, pictures, and lamp shades. With plain walls it is best to use a pattern in the curtains, as a rule, reserving plain curtains and drapes for papered or designed walls, avoiding the probability of a clash when a design is used against or near another design, as when a figured lampshade is superimposed upon patterned curtains. The use of too much pattern will confuse the ever-watchful eyes; therefore it is important to decide where to locate the design or decorative element in a room. Since it cannot be everywhere, a decision

must be made as to whether it is to predominate in the background or in the furnishings and accessories. Inasmuch as the latter can be more readily changed than the background, it is a safe rule to limit the "life," or pattern of a room to the furnishings and accessories. Failure to observe this simple principle may result in overdecoration, which at best induces a confused feeling to the beholder.

As mentioned in Chapter 5, there are three main types of color schemes, known as monochromatic (one color), analogous (closely related, or adjacent), and complementary (contrasting). Additionally there is what is known as the triad harmony, consisting of any three colors equally distant on the color wheel, such as orange, green, and violet, and the split complementary harmony, which is a combination of any color with the two colors on either side of its opposite on the color wheel, as red orange, blue and green. Pastels are the term used for the light value of a color, as for example, orchid, which is a light tint of violet.

To avoid becoming involved in a deep study of these systems, it is easier to choose a wallpaper or designed fabric that is not harsh or garish and follow the colors already grouped by the artists who designed it, as illustrated in Figure 10.13. That is why professional decorators always assemble swatches or 1¼-yd. samples of all colors to be used in a given room. This assembly should include samples of any and all paint, wallpaper, draperies, upholstery, floor covering, and other



Courtesy U.S. Gypsum Remodel Research House

FIG. 10.13. Matching the background to the fabrics.

accessories, and is a "must" before any final decisions are made as to color. All samples should be viewed together, both in daylight and under artificial light, since the latter causes a definite tonal difference in a color. Furthermore, the color samples must be of the proper texture, for, in the case of paint, for example, the results from the same can are different on wood than on plaster. If time permits, the sample assembly should be observed for several days or weeks; after that, if you like them, use them.

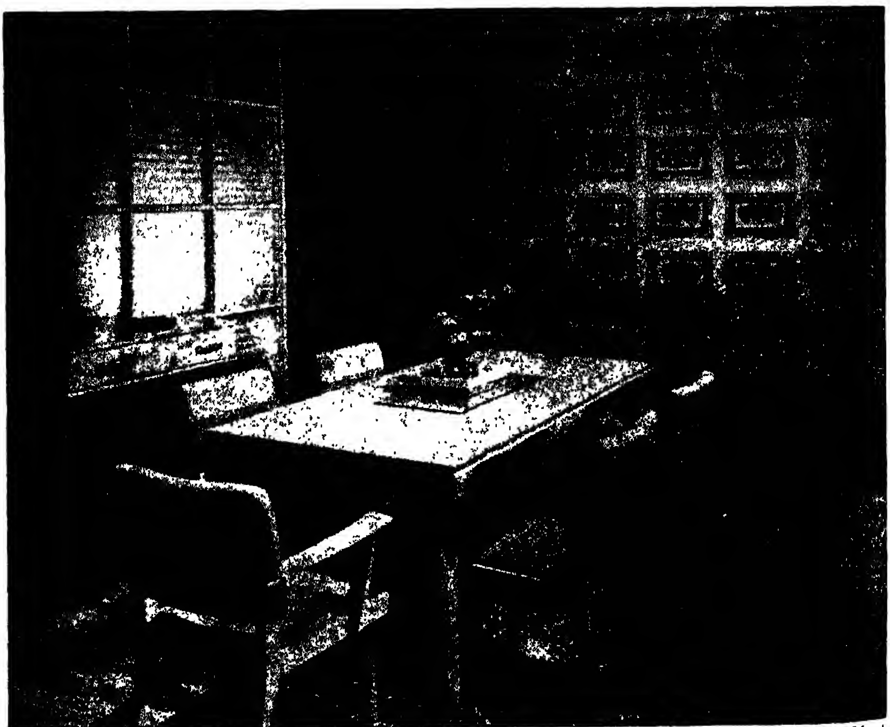
Before leaving the important subject of color there is the final consideration of exposure, which exercises so much influence upon the background. It will be noted that rooms having a southern or southeastern exposure are subjected to a great deal of light and warmth, thus permitting their background colors to be cooler and darker. A northern exposure also receives an abundance of light, but it is a cold light which needs warming with reds and yellows, through which the strong light will produce a warm glow. With such a light the use of gray should be avoided like the plague, for it will only make a cool, dark room colder and gloomier. Instead there should be recourse to colors that will help to develop the room's exposure, lighting up dark rooms with cream and yellow, warming chill rooms with rose and orange yellow, and cooling and darkening overbright rooms with greens, blues, and grays. A warmed grayed blue-green is an excellent year round shade, presenting a cool crispness during hot summer days, and reminding one of the warmth of nature during wintertime. Conversely, warm dark walls often form effective backgrounds for modern bleached furniture. Regardless of theory, the occupant of a room should always select the colors he or she *likes*, not those that are currently fashionable or "in style."

Scale. By scale is meant the relation of one piece of furniture to another in a room, as well as to the human figure. Furniture and furnishings not only should be similar in scale or size, to achieve harmony and balance, but must also be scaled to the room they occupy. Large pieces of furniture in a small room not only crowd but even clutter it; this leaves anything but a restful impression. The safe rule to follow is to keep furnishings on a small scale for small rooms. In accomplishing this, however, delicacy is not to be translated into fragility, and never should comfort be sacrificed for any reason. If, for example, a piano is desired in a small room, there are many reduced sizes to choose from, ranging from a spinet to a miniature grand piano with a standard keyboard. The same procedure is possible in the case of couches seating three or more people, which can be replaced by the compact loveseat, and armchairs are now available that are every bit as comfortable as the massive favorites of the Head of the Family. Bookshelves built into the wall not only save floor space, but also remove the impression of bulkiness; large mirrors, skillfully placed, have already been discussed as aids to the illusion of spaciousness. A final touch in the "enlarging" of a small room is to raise the ceiling by using long curtains or drapes, and to widen the floor with rugs or carpeting that extend from wall to wall, as in Figures 10.2, 10.5, and 10.9.

The reverse procedure will be necessary in a large, high-ceilinged room. Appointed with delicate furniture, such a room would seem almost empty. For this type of room, massive, but not clumsy, pieces are in order, which project into the room and help to fill its empty spaces. A wallpaper with a large bold pattern will help delude the eyes as to the room's actual size, and folding screens with large designs can be strategically placed to cut large areas and chop off useless corners.

Arrangement. Extreme care must be exercised in the grouping of furniture to prevent it from huddling together on one side of the room or in a single corner, thus overbalancing the layout. Table lamps and shades should be to scale, not too large for their tables or bases, and vice versa. Considerable thought should be expended upon the treatment of the windows; it never pays to skimp on curtain material, for this frequently results in the appearance of a window whose width is out of proportion to its height.

Dining room. Each room to be occupied should be analyzed to determine its basic purpose. If, for example, it is desired that the hallway be useful as well as hospitable, there should be receptacles for umbrellas, and racks or closets for

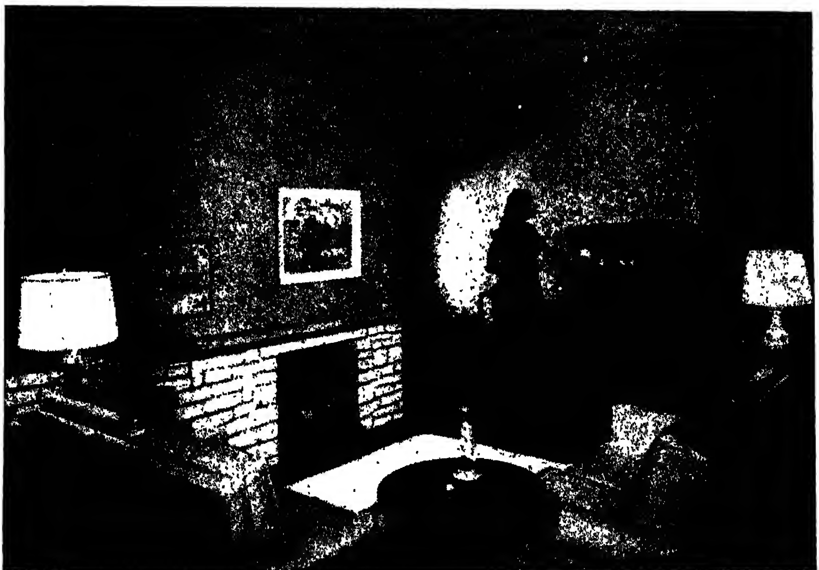


Courtesy American Furniture Mart

FIG. 10.14. Swedish Modern Dining Room.

hats and coats, as well as comfortable chairs to sit on. A dining room is the place where the family may eat three meals a day, requiring a suitable table and chairs, a sideboard or console and possibly a screen for the pantry or kitchen. Little choice is left in the arrangement of such a room other than the inclusion or exclusion of accessories and pictures, depending upon the amount of formality desired. A successful effort to brighten a formal dining room is pictured in the photograph of the modern Swedish interior shown in Figure 10.14, where the warmth of the decorated wall or background and the shaggy rug are definite factors in softening the austerity of a conventional arrangement.

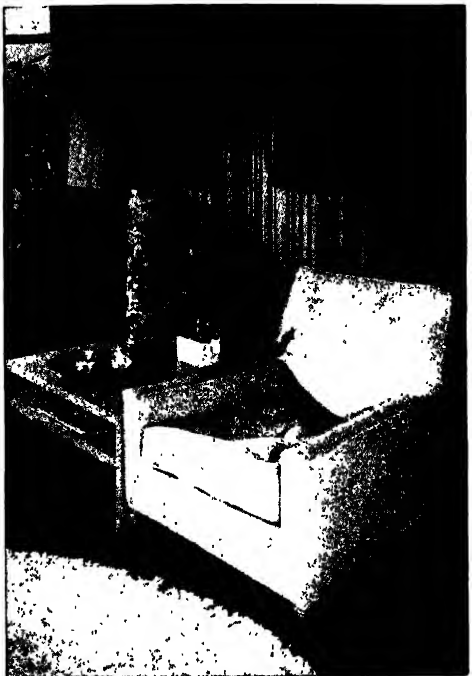
Bedroom. In bedrooms, arrangement is often dictated by the location of the windows, since a maximum amount of light is desirable for the dressing table, and a minimum amount of draft near the heads of the beds. Where space permits, bedroom furniture should be arranged so that there is freedom of movement between the dressing table, closets, bathroom, and outer door. Here the background is of great importance, depending on the age and sex of the occupant. A feminine bedroom or the nursery can very properly abound in delicate colors, organdies and chintzes, whereas the essentially man's room must receive sturdier treatment. The guest room, on the other hand, should be more noncommitally handled, for obvious reasons, and the same is true of the popular utility room, which is both guest room and workroom or study.



Courtesy R. H. Macy & Co.

FIG. 10.15. Cottage with Swedish fireplace.

Living room. It is the living room that is the center of family life and most often seen by visitors. In arranging its furniture it must be remembered that the basic purpose of a living room is to bring people together for conversation. Such being the case, chairs and couches should be kept in groups and not tucked away in corners. They should also be provided with tables or stands for teacups,



Courtesy James McCreery & Co.

FIG. 10.16. Comfortable, well-lit modern chair and table.

glasses and smoking accessories, and should of course be well lighted. If the room is fortunate enough to have a fireplace it should be made the focal point or center of interest, with the most comfortable chairs and couches grouped around it, as is the case in the cottage interior pictured in Figure 10.15. Pictures should be hung at eye level, and throw rugs and large pieces of furniture placed parallel to the walls, rather than on a restless-looking diagonal. Last but not least, the man of the family should be reassured by the presence of at least one strong comfortable chair and a solid table, something which will not "teeter" and give him a feeling of instability. As shown in Figure 10.16, such a combination is possible in modern designs, without recourse to massive lines.

One-room apartment. The above notes on living room arrangement are equally true in the case of the all-purpose, one-room apartment that must of necessity

masquerade as a living room except for the brief hours in which its day bed or couch-bed is made up for sleep, or its drop leaf table opened for meals. Built-in cupboards, bookcases, and chests of drawers are a boon in preserving the fiction of such a "living room," concealing everything from clothes and toilet articles, to dishes and bed linen. Attractively covered folding screens such as those described in Chapter 2 are excellent camouflage, which, when artlessly placed across a corner, can be made to serve as the walls of an extra "room." When the exposure or windows of the room will permit, an even better method is to hinge a pair of folding screens between two closets, as suggested in Chapter 4, or across the end of the room to form an alcove for the bed or the kitchenette.

Decorative Effects. This limited survey of the aims and principles of interior decorating has of necessity only touched the high spots of an important and useful subject, in an attempt to prove that with a little planning and foresight, the average homemaker can create an atmosphere in his or her home which is both tasteful and comfortable to live with. Much of the effect achieved will be at the expense of considerable elbow grease and handicraft. In the matter of backgrounds, however, today's so-called cold water paints that contain casein offer an easy medium for the amateur decorator, because they do not show brush marks. Although they are considered washable, it is advisable to paint the doors, windows and trim with an oil paint from which grimy finger marks can be easily wiped.

Walls and ceilings. Success in the application of any sort of paint or calcimine is dependent upon the condition of the walls or ceiling they are to cover. Old calcimine must be entirely scrubbed off with warm water, a process which can be expedited by adding a small amount of washing soda or TSP (trisodium phosphate) to the water. The same procedure is required when removing wallpaper, although the casein paints can be applied directly over wallpaper, and the author has used oil paint with success. Once painted, however, wallpaper will be much more difficult to remove at some later date.

Needless to say, all cracks in both walls and ceilings must be filled and smoothed. In order to insure that the patching plaster will be firmly keyed into the cracks, the latter must be undercut so that they slant inward, like an inverted V. A very handy tool for cleaning out cracks is an ordinary beer can opener.

Powdered plaster of paris with sufficient water added to make a paste is suitable for filling cracks, but is difficult to handle due to its quick-hardening quality unless retarded by adding glue or vinegar to the water. Swedish putty, used extensively in concealing wallboard joints, makes an excellent crack filler. It is prepared by allowing a mixture of 2 lb of casein glue powder in ½ gal of cold water to stand for 15 min. until fully dissolved, then stirring in 5 lb of bolted whiting, followed by ½ pt. of light colored, gloss outside paint and ½ pt of spar varnish. For a medium-sized job it is just as well to procure a commercial crack filler from the paint or hardware store.

In applying a patching plaster, the edges of the crack should first be damp-

ened to insure a good bond, and the plaster forced in with a putty knife or small trowel. Since it will shrink in drying, a slight crown should be left for sanding down level with the wall surface. In the case of a deep or wide crack, it is usually best to fill it in successive applications. Bulged wall areas indicate unkeyed plaster which should be cut out and replastered prior to applying the background paint or paper. Fine, hairlike cracks can often be filled by brushing on a mixture of 3 parts of linseed oil thinned with one part of turpentine, wider ones can be treated with white lead thinned to a paste with turpentine, a mixture which will probably have to be sanded when dry.

The fresh plaster patches should be sized with glue or shellac before painting or papering operations commence, especially if they have been rendered porous by sanding. The actual technique of painting is but a large scale application of the principles discussed in Chapter 5. It should be emphasized again, however, that cheap brushes become an extravagance when measured against the lost time required to remove loose bristles and to rebrush unequal distributions of paint. Except in the case of window and other trim, the use of too narrow a brush is equally time consuming. A good 3½- or 4-in. brush is excellent for covering the walls, and a good quality wide brush is a "must" for ceilings. The latter are often covered with calcimine, both for the sake of economy and to prevent too heavy a load if successive coats of oil paint are applied. However, many decorators

Courtesy Bloomingdale Brothers, Inc.

FIG. 10.17. Traditional furniture with modern lamps, curtains and chintz.

use a good quality of oil paint on the ceiling, which can be washed clean after the years have darkened it.

Wallpapering is a technique that has been the Waterloo of many an eager home decorator. Combining as it does the exacting requirements of careful measurements and a calm disposition, it is a project to be entered into only after due prayer and fasting, particularly if it is planned to paper the ceiling. When only a single wall, or a pair of moderately sized walls without too many window or door openings are to be covered, the ready-glued papers currently available can often be applied without excessive wear and tear on the temper. After careful measurements have been taken and the proper sized piece cut off, the whole section is "dunked" in the bathtub and is then ready to press onto the sized wall with a wallpapering brush. Borders are also available and a nursery paper is advertised that has a DDT insect-repellent formula

Floors. The proper way to refinish a wood floor is to sand it down to the natural wood. Electric scraping machines can be rented in many localities, but the edges of the floor which are next to the walls or radiators, must usually be finished with a hand scraper.

Once exposed and thoroughly cleaned, the finishing of a floor follows the routine described in Chapter 5, insofar as staining, filling, sealing, and varnishing are concerned. Pressed for time, many amateur refinishers have contented themselves with one or two coats of shellac, which offers little resistance to wear and must be eventually removed with alcohol and refinished properly. Spar varnish, while slower drying, makes a wear-resistant final coat. Repeated waxings are additional insurance, but should be applied to only a clean floor to prevent darkening from the dirt and dust absorbed by the wax.

Conclusion. To point up this brief outline of a book-length subject, the following list of Do's and Don'ts is offered as a guide for the beginner:

DO

Make scale cutouts of furniture and arrange them on a scale plan.

Remember that simplicity enhances beauty, and leave some bare spots in the rooms.

Change the furniture arrangements every few months and study the results.

Choose colors you like, not those that are recommended as popular.

Study samples of all colors to be used before the actual work or buying commences.

Make the family comfortable.

DON'T

Don't avoid unusual arrangements merely because they are novel.

Don't be afraid to mix periods; it's been done for centuries (Figure 10.17).

Don't overpattern or place two strong patterns close together.

Don't try to match a rug to the walls or curtains. Plain rugs or carpeting harmonize more easily with a decorative scheme.

Don't be so practical that only drab results are achieved. All colors and fabrics will soil eventually.

Don't make the family uncomfortable.

11

INDOOR REMODELING

SEVERAL years ago, when the author was literally knee-deep in the plaster and lath from torn-out partitions in his newly enlarged living room, a friend who had dropped in to view the proceedings, after looking over the situation, gravely extended an unlit match with the quizzical advice to apply it as the cheapest method of remodeling. In those days it often happened that extensive remodeling jobs turned out to be more expensive and, in the final analysis, less satisfactory than building from the ground up. Such is decidedly not the case today, however, as any one knows who has even scratched the surface of an inquiry into building costs.

Moreover, in spite of the scarcity or expense of certain building materials, the home owner who likes to create things with his tools can frequently adopt a "pay as you go" policy in his remodeling plans, when time and the immediate occupancy of the projected alterations are not limiting factors. This is especially true of conversion of waste space in the basement into a recreation room, or the construction of a room or small apartment in an unfinished attic.

Perhaps more than any other advance in the building material field, the extensive production of various wallboards, by eliminating the precision and delays incident to plastered walls, has enabled professional and amateur carpenters to complete the interior of a room from partitions to ceiling. Soundproofing and insulation can be provided by rock wool and other insulating materials in rolls, batts and loose flakes, while each year brings refinements in wallboard materials, simplifying both application and surfacing.

Armed with the recognition of a few basic facts, such as the knowledge that 2 in. by 4 in. lumber ("2 × 4's") is milled down 3/8 in. until the dimensions are roughly 1 5/8 in. × 3 5/8 in., that most studding is set 16 in. on centers but can be extended to 24 in. when properly braced, that the majority of wallboards are 4 ft. wide, and that all existing floors, walls and ceilings should be checked with a level before laying out new construction, the home remodeler, with average care and foresight, can turn out a job whose workmanship will be astonishingly finished and satisfactory.

The advice that has been consistently plugged throughout this volume, to "first draw up a plan," is hardly necessary when it comes to a major alteration, for it is difficult to visualize a worker who would have the temerity to proceed without some sort of "hen tracks" to guide him. The construction of new partitions, moreover, offers an excellent opportunity to include some of the Built-in Conveniences discussed in Chapter 4, which must be co-ordinated, of course, with existing or projected openings, as well as with furniture and fixtures. Much can be learned from the inspection of old construction that must be demolished in the process of alteration. Yet the ultimate success of the project is dependent upon prior planning and common "horse" sense.

Lumber terms. In order to promote a common language, the United States Department of Commerce and the various lumber associations have agreed upon the following terminology, which may aid the home craftsman when placing orders with his local lumber dealer.

Yard lumber is of all sizes and patterns intended for general building purposes. It is classified according to size as follows:

Strips: yard lumber less than 2 in. thick and less than 8 in. wide.

Boards: yard lumber less than 2 in. thick but 8 or more inches wide.

Dimension: all yard lumber except boards, strips and timbers, i.e., that which is from 2 in. to, but not including, 5 in. thick, any width.

Timbers: lumber that is 5 in. or more in its least dimension.

Structural lumber: that which is 2 or more inches thick and 4 or more inches wide, intended for use where working stresses are required. It is classified by size as follows:

- *Dimension (joists and planks)*: lumber from 2 in. to, but not including, 5 in. thick, and 4 or more inches wide.
- *Timbers*: lumber which is 5 or more inches in its least dimension.
  - *Beams and stringers*: pieces having a rectangular cross section which is 5 or more inches thick, and 8 or more inches wide.
  - *Posts and timbers*: pieces of square or approximately square cross section 5 in. × 5 in. and larger.

Lumber is further classified to the extent to which it has been manufactured or "worked," as follows:

Rough lumber: lumber that is undressed, just as it comes from the saw.

Surfaced lumber: lumber that is dressed by running it through a planer. When surfaced on one side it is designated (S1S); on two sides (S2S); on one edge (S1E); on two edges (S2E); on a combination of one side and one edge (S1S1E); on two sides and one edge (S2S1E); on one side and two edges (S1S2E); or all four sides (S4S).

Worked lumber: that which has been run through a matching machine, sticker or molder, as follows:

Matched lumber: lumber that has been worked to provide a tongue-and-groove joint at the edges or at the ends in the case of end-matched lumber.

Shiplapped lumber: worked lumber providing a rabbeted or lapped joint at the edges.

Patterned lumber: shaped to a patterned or molded form.

STANDARD SOFTWOOD MEASUREMENTS

Rough yard lumber	*Width, inches*	*Standard thickness (S1S) or (S2S), inches*	*Standard minimum dimensions, inches*
Common strips and boards 1, 1 1/4, 1 1/2	3, 4, 5, 6, 7, 8, 9, 10, 11, 12	25/32, 1 1/16, 1 5/16	2 5/8, 3 5/8, 4 5/8, 6 5/8, 7 1/2, 8 1/2, 9 1/2, 10 1/2, 11 1/2
Dimension 2, 2 1/2, 3, 4	2, 4, 6, 8, 10, 12	1 5/8, 2 1/8, 2 5/8, 3 5/8	1 5/8, 3 5/8, 5 5/8, 7 1/2, 9 1/2, 11 1/2
Finish	3, 4, 5, 6, 7, 8, 9, 10, 11, 12	5/16, 7/16, 9/16, 11/16, 25/32, 1 1/16, 1 5/16, 1 7/16, 1 5/8, 2 1/8, 2 5/8	2 5/8, 3 1/2, 4 1/2, 5 1/2, 6 1/2, 7 1/4, 8 1/4, 9 1/4, 10 1/4, 11 1/4

Standard lengths of softwood lumber range from 6 to 18 ft., usually increasing by multiples of 2 ft. Since many lumber dealers carry lengths less than 6 ft. in the interests of economy it is wise to "prowl" in the local lumberyard to learn its possibilities.

Nails. Common nails and brads are designated by the letter "d" indicating "penny"; thus 8d = 8 penny. In order to determine the length required of a nail in pennies, the thickness of the board to be penetrated, for example, 25/32 in., is multiplied by 8. Then 1 1/2 is added to the result, which in this instance indicates an 8d nail: ($\frac{25}{32} \times 8 = 6\frac{1}{4}$; $6\frac{1}{4} + 1\frac{1}{2} = 7\frac{3}{4} = 8$).

To reverse the computation, when only the penny size is known, to determine the length in inches (up to 10d), the penny size is divided by 4 then 1/2 is added. For example, an 8d nail measures 2 1/2 in. because $8 \div 4 = 2 + \frac{1}{2} = 2\frac{1}{2}$.

CONSTRUCTING A NEW INSIDE DOORWAY

Cutting the Opening. After selecting the position for the proposed door, the wall is tapped with a hammer to locate by sound the existing studding. Studs are the vertical wall members, usually 2 × 4's, which support the horizontal wooden laths, plasterboard, or wallboard. As previously mentioned, they are generally spaced on 16 in. centers, that is, 16 in. from the center of one stud to

that of the next. A little practice in tapping will soon indicate the presence of studding by a solid sound, in contrast to the hollow echo between.

If possible, one side of the door should be located next to a stud, The width of the door will probably make it necessary to cut through two studs to the right or left. By means of a plumb line, a long straightedge and level, or a mason's level, a vertical line is drawn on the wall along the door side of the stud, 5 in.

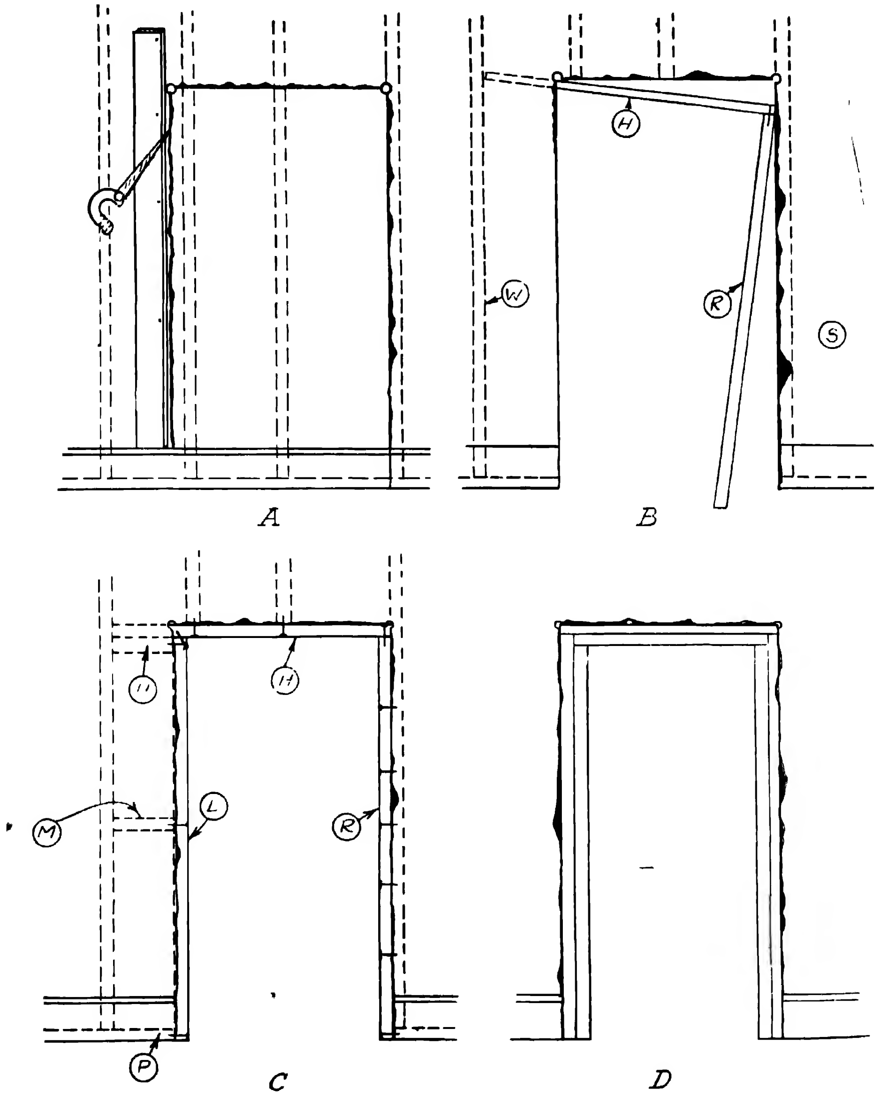


Fig. 11.1. Framing the opening.

longer than the height of the door. From the top of this line a horizontal, level line is scribed across the width of the doorway, plus 8 in., and connected with another vertical line, parallel to the first one. The extra allowances will provide for double studs and headers, as well as for the door jambs and wedges.

The plaster is cut through along the lines with a cold chisel or an old wood chisel and hammer. To prevent jagged edges a long board or scantling can be lightly nailed along each line before chiseling, as in A of Figure 11.1. The horizontal line for the header is chiseled along the nearest interval between laths. After boring large starting holes at the upper corners, a coarse compass saw is used since it will bind less than the ordinary handsaw, when cutting across the laths down the vertical lines chiseled in the plaster. These vertical lines are continued down through the baseboard, and at the baseboard a handsaw is used.

The lath and plaster within the opening can now be removed. The exposed studs are sawed horizontally across a level line at their tops and wrenched loose from their floor plate. If the latter is above floor level, it too must be sawed flush with the door opening.

Framing the Opening. A header (H) in B of Figure 11.1, is cut from 2 × 4 material, long enough to fit snugly between exposed stud (S) and the one inside the wall, (W). An upright trimmer (R) is cut and nailed to the end of the header, and the two inserted at an angle between the open walls as in B, so that they can be twisted slightly and eased into an erect position and spiked to the studding as indicated in C.

If the floorplate (P) of detail C is above the floor level, it can be measured and a duplicate piece cut and nailed to the hidden end of the header at (U) and another midway at (M), after cutting trimmer (L) and testing it for plumb. This will present little difficulty if the exposed side of the trimmer, after it has been carefully plumbed, is marked where it touches both the header and the floor. By measuring the distance from the mark on the header to the hidden stud in the wall and deducting the thickness of the trimmer (usually 1¾ in. for a surfaced 2 × 4), the length of (U) can be accurately determined. The same procedure will be required for a floor plate. It will be easier to spike the small section (U) to the header before the latter and its side trimmer (R) are nailed into place.

Trimmer (L) can now be spiked into position, after which the double header and trimmers can be fitted and fastened into place, as shown in D of Figure 11.1. Any loose laths can be tacked to the sides of the trimmers.

Fitting the Jambs. It is economical to purchase the jambs, stops, trim and saddle as a complete set. If such sets are not available, or if old trim or jambs are not at hand, they can be cut to fit from 1 × 5 in. material. The two side jambs are cut first, to fit snugly into the framed opening. They are then placed in position to determine whether excess material must be ripped off one edge so that the trim will fit flush against the walls when fastened to the edges of the jambs. Nowadays, with both 2 × 4's and 1 × 5's surfaced to scant widths, there may be no excess to cut in the case of thickly plastered walls.

Clearances. If the door is to be stained and varnished, it should be hung within the jambs so that (in a dry climate) there will be a 1/16 in. clearance between its sides and top together with an allowance of 5/8 in. for a saddle, if used. For painted doors (or in a prevalently damp locality), these clearances should be increased to 3/32 in. In the latter case, the lower edge of the head jamb must be measured off to a minimum distance of the height of the door plus 11/16 in. when a saddle or carpeting under the floor is to be used. Both dadoes are kerfed 3/8 in. deep. After they have been cleaned out, and the side jambs once again placed in position in the door opening, the head jamb is measured to the width of the door plus 3/4 in., see Figure 11.3.

Locating the hinges. Before nailing the head jamb into place, it is a good plan to cut the mortises for the hinges while the side jambs can be worked on the bench. A good rule to follow is to locate the top edge of the top hinge in prolongation with the bottom edge of the top rail, and the top edge of the bottom hinge in prolongation with the top edge of the bottom rail, as indicated in Figure 11.6. When the rails are of peculiar proportions or are non-existent, as in the case of a single-paneled, plywood door, many carpenters set the upper hinge 5 in. down from the top of the door, and the lower hinge 10 in. up from the bottom. Assuming that loose pin hinges are being used, a pair can be separated by removing the pin so that one of the halves can be used to measure the mortises or gains in the side jamb. Ample clearance for opening the door will be assured if the hinge pins extend beyond the flush trim. If the outer edge of the casing is trimmed with a thicker band, however, the distance must be increased accordingly. It is therefore well to use a block of wood of a thickness equal to that of the trim and its band, if any, when scribing the hinge gain. A butt gauge, if available, is useful for accurate scribing, as shown in Figure 11.2. Since most hinges are beveled, the gain should be dovetailed or undercut slightly, so that the hinge can be slipped in from the side. When trimming out the gains, if one or more is cut too deeply, or a side of the mortise is split, chips or splinters can be glued back into place to rectify the error.

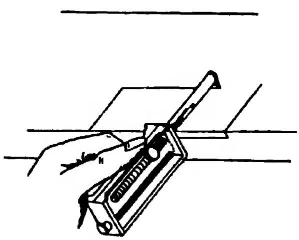


FIG. 11.2. Using a butt gauge.

Truing up the jambs. After both hinge gains have been cut in the side jambs, the head jamb can be nailed into place in its dadoes and the entire assembly placed in position within the door framing. The extra 8 in. included in the width of the door opening not only allowed for the thickness of four trimmers and two jambs, but for wedges between the trimmers and jambs for fitting the latter accurately into place. It therefore will be found advantageous to cut spreader (S) in Figure 11.3 the width of the door plus 1/8 in. for clearance, before truing up the jambs. As shown in the drawing, this is done by driving in pairs of shingles from opposite sides, points first. Any twists in the jambs can be overcome by

driving the wedges in deeper under the twisted edges. Both hinges should be solidly backed by these wedges or shims, as well as the lock strike plate, located 3 ft. from the floor.

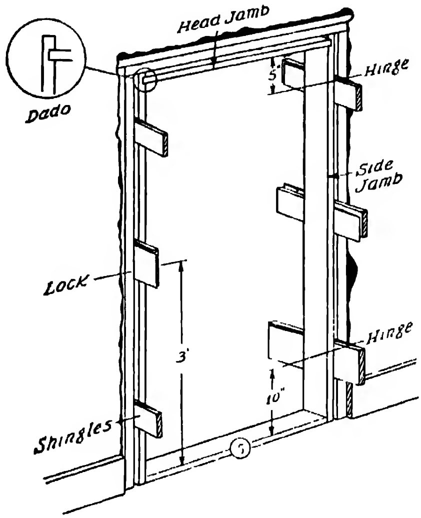


FIG. 11.3. Truing up the jambs with wedges.

Great care should be exercised in truing up the jambs on both faces and edges; a jamb out of plumb on the hinge side will result in either an always open or a self-closing door, depending upon which way the edge or the face of the jamb tilts. It may be necessary to cut some of the waste extending above the dadoes in order to level the head jamb properly.

Once trued up, the jambs can be permanently fastened to the door framing with long finishing nails. A line of these nails can be driven in near the center, where they will be covered by the door stop, which is a strip mitered into place inside the jamb to limit the door's swing against the hinges. The position of the stop can be predetermined by measuring in from the hinge side a distance equal to the thickness of the door (usually 1⅜ in.) minus the thickness of the trim (a standard ¾ in.) After this line has been drawn, a parallel line can be scribed to indicate the width of the door-stop material being used. To keep the jambs flat, the edges can be toenailed in the manner indicated in Figure 11.4, in order to conceal the nailheads.

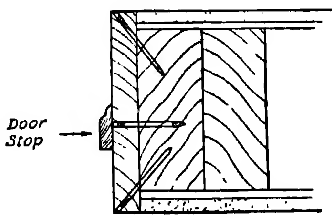


FIG. 11.4. Fastening a jamb to the door.

These nails must be so placed, however, as not to interfere with the installation of the hinges or lock strike plate.

Attaching the Trim. With the jambs fastened in place, the trim can be nailed into position. Using a piece of the trim as a straightedge, after its inner edge is aligned flush with the inner edge of its side jamb, the baseboard can be scribed the exact amount which must be cut to permit the trim being nailed into position. In order to cut these pieces, the baseboards will either have to be removed entirely, or prized out at their severed ends with a pinch bar far enough so that they can be cut along the marks with short saw cuts. When using the pinch bar, the plaster wall should be protected with wide pieces of board as soon as a purchase has been secured by driving in an old screwdriver or blunt chisel behind the baseboard. When assured that there is room for the side trim, the baseboards are renailed against the wall.

Next the trim on the hinge side must be mortised in prolongation of the hinge mortises in the jamb. To insure a neat fit for the head trim, it is well to tack both pieces of side trim in place, with their inner edges flush with the inner edges of the side jambs, then hold a piece of head trim horizontally across the upper ends of the side trim until its lower edge coincides with that of the head jamb, and mark both pieces of side trim. At the same time the ends of the head trim can be marked off with a straightedge so that when cut the edges will be an accurate extension of the vertical sides of the trim, regardless of angles. The trim can now be nailed flush with the edges of the jambs, and the nailheads countersunk. The door stops can be temporarily tacked into place along the sides, with the nails driven in only part way.

Hanging the Door. In specifying the clearance to be allowed for the door when constructing the jambs, it was assumed that a used door was available. If a new door is to be used, however, it can be sawed and planed to fit. In many regions doors are available in the following sizes:

TYPICAL STOCK DOOR SIZES

2 ft.–0 in. × 6 ft.–6 in. and 6 ft.–8 in. × 1⅜ in.
2 ft.–4 in. × 6 ft.–6 in. and 6 ft.–8 in. × 1⅜ in.
2 ft.–6 in. × 6 ft.–6 in. and 6 ft.–8 in. × 1⅜ in.
2 ft.–8 in. × 6 ft.–6 in. and 6 ft.–8 in. × 1⅜ in.
3 ft.–0 in. × 6 ft.–8 in. and 7 ft.–0 in. × 1⅜ in.

FRENCH DOORS (PAIRS)

(10 and 5 light design)

4 ft.–0 in. × 6 ft.–8 in. × 1⅜ in.
5 ft.–0 in. × 6 ft.–6 in. × 1⅜ in.
5 ft.–0 in. × 6 ft.–8 in. × 1⅜ in.
5 ft.–4 in. × 6 ft.–8 in. × 1⅜ in.
6 ft.–0 in. × 6 ft.–8 in. × 1⅜ in.

New doors are assembled with their stiles extending beyond the rails, forming "horns" which must be cut off before any measurements can be taken for fit. The sides can then be planed sufficiently to permit standing the door within the side jams, after the spreader has been removed and replaced by the saddle. With the bottom of the door resting on the saddle and the top propped up or held tight against the head trim by a second person, a line can be scribed along the top rail from the other side. After measuring off the required clearance the correct amount of waste can be cut from the top, and the door fitted against the stops to determine the amount of planing required for side clearances. A slight bevel should be planed on the inside edge of the lock side of the door so that, as it opens, it will clear the jamb without binding. A convenient method for holding the door when planing its edges or mortising the hinges and lock is to construct a door jack as shown in Figure 11.5, consisting of two pieces of 2 × 6 or 2 × 8, nailed to a piece of lath and two pieces of scantling just far enough apart to receive the door when placed on edge.

As indicated in Figure 11.6, after the door has been trimmed and planed, it is held tightly in its frame against the stops by means of thin wedges or splinters thrust into the three crevices. When all clearances have been satisfactorily adjusted, the placement of the hinges on the door edge can be accurately marked by placing the blade of a steel square against the trim and marking a short line where the tops and bottoms of the hinge mortises are located in the trims; or a very narrow chisel can be inserted in the crack between the door and the jamb to mark the mortises by wedging its sharp corner inward against the door.

With a butt gage or the half of a hinge, the mortises are scribed in the door edge, then chiseled out with an undercut edge as was done in the jambs. The hinge halves are then slid into place and holes for the screws bored with a spiral drill slightly to the rear, so that the screws, when driven home, will pull the hinge plate tightly against the rear of the gain.

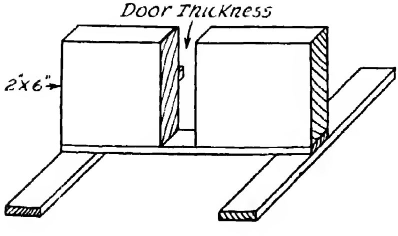


Fig. 11.5. Door jack.

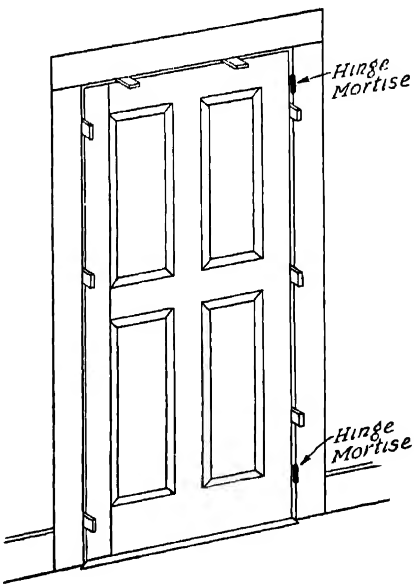


Fig. 11.6. Checking the door for fit.

Cutting the lock mortise. If the lock to be installed is of the mortise type, it is a good time to bore out the series of holes that form the basis for its mortise while the door can be reversed in its jack. For the average adult the lock should be so located that the doorknob will be 3 ft. from the floor or bottom edge of the door. This can be assured by marking a short horizontal line on the center rail 3 ft. from the bottom edge, then holding the lock (with spindle and knobs removed) against the side of the door stile, with its front edge flush with the edge of the stile and its spindle hole on the line just drawn. The position of the spindle and keyhole can then be marked accurately with an awl or a sharp nail. If standard, individual roses-and-key escutcheons are to be used, a ½ in. hole for the spindle and a ⅜ in. hole for the boss of the key are bored, first from one side, then, as the spur breaks through, from the other. The straight part of the keyhole can be cut later with a small bit and chisel. If long escutcheon plates act as combination spindle roses and keyhole plates, both holes can be bored with a ¾ in. bit.

Next a center line is established on the edge of the door stile, and four or five holes of suitable size bored to form a snug mortise to the depth of the lock plus its front lock plate. After the edges of the mortise have been trimmed into a rectangle with a butt chisel, the lock can be slipped into place and the protruding lock plate or selvage scribed for its mortise. This shallow mortise should be chiseled out a scant 1/16 in. deeper than the actual thickness of the lock plate to permit planing the edge of the door in the event of later swelling. Once the lock plate is screwed tightly into place, the spindle inserted through its roses and the knobs fastened into place, the door is ready for hanging. The keyhole escutcheon plates can be screwed on after the door is hung.

The other halves of the hinges can now be fastened into their mortises in the jamb, using one screw for each half, and the door hung against its temporary stops by inserting the hinge pins. As the door is gently opened and closed, the pins should be closely observed for movement, an indication of an improper set of their hinges. If this happens, the direction in which the hinge moves to adjust itself should be noted carefully, so that when it is removed its mortise can be recut properly, or shimmed up with cardboard if necessary to correct the initial error.

As explained in Chapter 8, when only one corner of a door sticks or bumps, often all that is required is to shim up the hinge diagonally opposite, or to sink deeper the hinge across from the offending corner, in order to draw the opposite corner closer to the jab. Both hinges will have to be mortised deeper if the entire lock stile strikes the jamb; or the door edge can be planed down the extra 1/16 in. allowed for the lock plate. On the other hand, if so much space exists between the lock stile and the jamb that it is obvious that the lock cannot latch, the hinges must be shimmed out with thin pieces of wood or various thicknesses of cardboard. After any necessary adjustments have been made, and the door swings satisfactorily, the remaining screws in the hinges can be driven into the jamb.

Installing the lock strike plate. The lock or latch strike plate should be carefully located in order to prevent the future annoyances occasioned by rattling or binding. To this end it is well to examine first the temporary door stop to determine whether it holds the outside surface of the door flush with its trim. It is a simple matter to secure an exact imprint of the flat surface of the lock bolt by turning it by means of the key against a piece of carbon paper on the jamb; a partial impression of the latch can be obtained in the same manner by manipulating the doorknob. With the door closed, another method is to squeeze the point of a small nail file or a sharp awl into the crack and scribe horizontal marks in the jamb along the top and bottom edges of both latch and bolt. The door is then opened and the distances from its outer edges to the vertical sides of the bolt and latch are carefully measured and transferred to the jamb, completing the rectangles partially outlined by the horizontal scratches.

By holding the strike plate against the jamb so that its openings exactly correspond to the marks on the jamb, it can be used as a templet for its mortise, by scribing around it with a sharp knife. After its shallow gain has been cut, it can be held in its mortise while the bolt openings are marked with a pencil or small chisel. These are bored to the required depth with bits of suitable size, and the plate screwed into place for testing, with screws which are much shorter than those to be used for its permanent installation.

If the strike plate is improperly fitted so that the latch slips into its opening before the door contacts its stop, a rattling door will result, requiring the shifting of the plate nearer to the stop. The reverse condition will either prevent the door latching or locking at all, or require a sharp slam to permit the lock to function. The movement of the plate to right or left (or up or down, in some cases) will probably require a slight paring of one side of the bolt holes. The replacement of the short screws with long ones should complete the operation.

If the lock at hand has the beveled face of the spring latch facing the wrong way, it is a simple matter to lay it face up and remove the screw or screws that hold the side plates together, and lift off the top plate. The latch can then be lifted out, turned over and replaced, and the plate screwed back in place.

INSTALLING AN EXTRA WINDOW

Cutting a new window in a frame house is both an outside as well as an inside project that offers no greater obstacles than those confronted in cutting a new doorway, other than some ladder or scaffolding work on the outside of the house, if the installation is to be above the ground floor.

From the interior, there frequently will be little choice in the location of the new window. As with the placement of a new doorway, however, construction will be simplified if one side of the window frame can rest against an existing stud. The other consideration in cutting the new window opening is the appearance from outside. If there is a window almost above or below the proposed window

opening, an attempt should be made to keep the new window in line, if possible. In any event the top or head casing of the window should line up with the tops of all other windows on the same floor level, regardless of size.

Dimensions. Because it is customary in many sections to list windows according to the size of the glass in the sash, in order to determine the size of the opening which must be cut for the new window, it will be necessary to make first a few simple computations. It is therefore appropriate at this point to invite attention to the nomenclature of double-hung, four-light sash indicated in Figure 11.7.

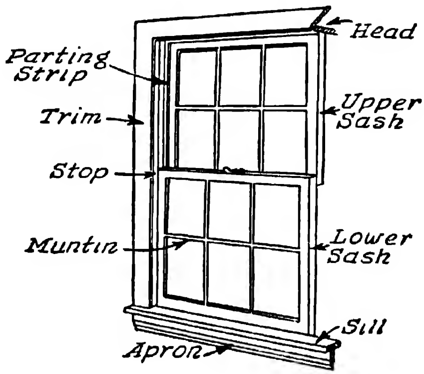


FIG. 11 7 The parts of a window (inside).

Standard dimensions for sash are as follows: top rail, 2 in.; meeting rail from rabbet to rabbet, 1 in.; bottom rail, 3 in.; total, 6 in. The framing thicknesses are: top jamb, 1 in.; sub sill, 1 in.; sill, 2 in.; total, 4 in. Allowing 1 in. for play the rule of thumb for computing the vertical distance is to add 11 in. to the sum of the glass measurements plus ¼ in. for each horizontal muntin. In like manner 5 in. are habitually allowed for the width of the sash between pulley stiles, with 5 in. more added for the sash weight boxes, or a total of 10 in. plus ¼ in. for each vertical muntin. The sash width of casement windows requires an additional 3 in. for clearance, with another 3 in. added to the height for outward swinging windows, and 4 in. for inward opening sash. Standard windows in many sections are listed as follows:

TYPICAL MODULE WINDOW OPENINGS

(Double-hung, checkrail, two light)

2 ft.– 0 in. × 4 ft.– 6 in.	2 ft.–8 in. × 4 ft.– 6 in.
2 ft.– 4 in. × 4 ft.– 6 in.	2 ft.–8 in. × 4 ft.–10 in.
2 ft.– 4 in × 4 ft.–10 in.	3 ft.–0 in. × 4 ft.–10 in.
3 ft.–0 in. × 5 ft.– 2 in.	

(Casement type—pairs)

2 ft.–8 in. × 2 ft. 6 in.
2 ft.–8 in. × 3 ft.–0 in.
2 ft.–8 in. × 3 ft.–6 in.
3 ft.–0 in. × 3 ft.–0 in.
3 ft.–0 in. × 3 ft.–6 in.
3 ft.–0 in. × 4 ft.–0 in.
3 ft.–4 in. × 3 ft.–0 in.
3 ft.–4 in. × 3 ft.–6 in.
3 ft.–4 in. × 4 ft.–0 in.

To these dimensions must be added the thicknesses of the double studs or trimmers, and the double headers and sills used to frame the opening. This will increase the size of the opening by 3½ in. on all four sides if both headers and

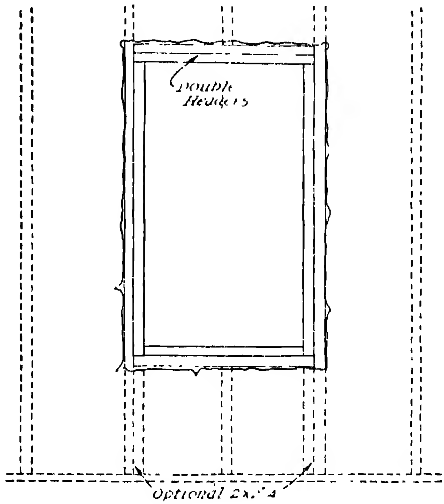


FIG. 11.8 Framing a window opening

sills are of 2 × 4 material placed flat, as in Figure 11.8. In new construction it is customary to leave a space of 1 to 2 in. between the two headers to allow for sag; since this treatment would cause considerable defacement of the wall above the head trim on the inside of the house, it will be safe to compromise with unspaced headers if the window span is not too great. When inserting a window in an unfinished attic, it is good practice to fasten both headers and sill on edge, for greater bearing strength.

Since the fitting of sash is a precision job, it will be best to purchase the window frame complete. Generally the stiles, jamb, sill, sash weight pockets, parting strips and stops come knock-down, with the sash only roughly fitted. Rather than rely on arithmetic alone for the over-all dimensions of an opening which is to be cut through the outside wall of a house, a more discreet procedure would be to assemble

the frame first, using it as a templet if necessary, or at any rate taking its actual measurements and adding the header, sill and trimmer thicknesses, as well as the outside casing.

Cutting the Opening. Having determined the over-all dimensions of the window opening, the next step is to mark them off on the outside wall so that the new window will be lined up properly with those already installed. Of course, this step can be omitted if the new window is to be the only one in a wall or the only one in the gable end of an unfinished attic. When marking the outside dimensions, care should be exercised that the header and sill marks are level and the sides plumb. In order to orient the work from inside, two holes large enough to start a compass saw can be bored from the outside through the inner wall, one at either end of the header line.

The procedure from the room side is the same as for constructing a doorway. If the outside location of the window is unimportant, the plastered wall is tapped to locate the studs. Otherwise, the marks outlining the opening are plumbed and leveled with reference to the two holes bored from the outside, and the plaster cut through with a cold chisel. The keyed plaster is knocked out from between laths along the horizontal lines. Then the laths are cut along the vertical lines with a compass saw inserted in the holes already bored from the outside. The lath and plaster can then be removed and the house siding, whether of clapboard or shingles, sawed out in the same manner, from the inside if desired.

It is better practice, however, to saw the house siding from the outside, so that an exact fit can be assured around the casing for final weatherproofing. Furthermore, it will usually be necessary to remove a course of clapboard, beveled siding or shingles above and below the window opening. In the case of beveled siding or clapboards, this can be done by gently prying out the course with a thin pinchbar or old chisel and then inserting a series of wedges until a piece can be cut out with a saw. Shingles can be removed with a shingle hook which reaches up and cuts the nails under the upper courses. If a shingle hook is not available, a hacksaw blade, well taped at one end, will do the job. Enough shingles should be removed on both sides of the opening to allow for the casing with room to spare, if the shingles are of fairly large widths, which must be later trimmed to fit before refastening.

After the vertical lines have been sawed through and the siding removed, the exposed studs can be carefully sawed horizontally at header and sill. The header and sill, with their doubled vertical studs or trimmers, can then be installed in much the same manner as was explained in the previous section on doorways, as shown in Figure 11.8. Before they are nailed fast, however, it is a good idea to set the window frame in the opening for a final check.

Fitting the Sash. Besides ease of movement within the frame, the two main requirements for well-fitting sash from the standpoint of weather are: (1) the tops of the meeting rails should be flush and, of course, parallel; and (2) the bottom rail should make a tight fit with the sill.

The upper sash is first inserted and jointed to receive the parting rail. The lower sash receives the same treatment and should be checked to see that the meeting rails (Figure 11.9) are flush and parallel. Then with the sash closed to their fullest extent, a pair of dividers can be used to determine what excess must be cut off the bottom rail in order to bring the top rails flush. This amount of waste is scribed along the inside of the bottom rail by marking two arcs with the dividers and drawing a line tangent to them with a straightedge. A bevel gage can be set to the slope of the sill and this additional measurement substracted from the waste to be cut from the bottom rail. In planing off this bevel, it should be cut slightly more acute toward the outer edge of the bottom rail, so that a close fit against the sill will be insured.

Fig. 11.9. Jointing the meeting rails.

When buying sashcord it is poor economy to purchase other than the best grade of braided cord. As many a home mechanic has learned to his cost, the replacement of frayed or broken sashcord at some later date, when the windows are already installed and painted, is tedious business. In fact, now is the time to study what strips must be removed in replacing an upper or lower sashcord, where the pocket facings are for the pulley weights, and how to remove a parting strip that is painted fast. Allowing 5 ft. per cord, at least 20 ft. will be required, making it economical to purchase an entire hank.

One end of the sash cord is threaded through an upper sash pulley and knotted to a sash weight in such a manner that the cord will not pull directly over the axis of the weight, permitting it to rotate and swing as it travels upward. Without cutting the hank, the sash weight is raised until it strikes the pulley. The sash is then pushed down to its lowest position in the frame, and the edge nearest the weight swung outward, so that the cord can be held against the sash edge and cut off about 6 inches below the hole. The cord is then placed in the groove and a simple knot tied to its end, which is forced into its hole, where it is held in place with a light nail through its center. After the other side of the sash is fastened in like manner, the sash is raised and lowered to check the cord lengths.

The parting strips, which are neither nailed nor glued, are held in place by their close fit. After they are in place, the cords to the lower sash can be fitted and checked. Next the stool is fitted over the apron of the rear trim and the stop strips cut off, if necessary. The stop strips must be adjusted in front of the lower sash, preferably with screws so that they can be removed easily later, if required. Care must be exercised to fit these stops loosely enough to permit raising the window, but not so loose that the window will rattle or let in excessive cold air blasts.

The complete window can now be placed in its opening, using wedges where necessary. The casing is nailed on from the outside and checked for level and plumb before nailing the siding of the house.

A large percentage of the most annoying leaks in many homes can be traced

to the improper installation of windows and doors, particularly around the drip caps. It is recommended therefore that not only the drip cap of the new window be covered with flashing tin, bent at an obtuse angle which will permit its being tacked to the house wall where the course of shingles or beveled siding was removed over the window aperture, but that similar narrow strips be tacked along the outside edges of the casing, after being bent at right angles and slipped under the siding. If enough shingles were originally removed, they can be renailed over the tin. The tin strip underneath the sill can be omitted if the sill has a groove into which the lower course of beveled sidings or shingles will fit snugly. To prevent rust, this tin should be painted before nailing the cut shingles or siding back in place. The top course is renailed over the slanting tin capping, with a resulting weatherproof job all around. Galvanized shingle nails should be used where they are necessarily exposed, to prevent rust stains.

Inside the room the frame car be securely nailed to the studding, the trim attached, all nails countersunk and puttied and the primer coat applied outside and inside. In painting the sash, much annoyance and tinkering at a later date will be avoided if care is used to prevent the formation of a tight film of paint between the stiles of the sash and the stops and parting strips in the frame. If the weather permits they should be left halfway open while the paint is drying, so that they can be easily raised and lowered to break any paint film which forms. Under no circumstances should the faces of the pulley stiles be painted. They should be either oiled or coated with hot paraffin, and the surplus removed.

Picture Windows. The rows of sash placed side by side in many an enclosed porch have within recent years spread to certain ground floor walls of the house itself. Where the window commands a view of a garden or an attractive landscape, large horizontal sashes have gained popularity as picture windows. As indicated

Courtesy Andersen Corporation

Fig. 11.10. Picture window framed by single casement windows.

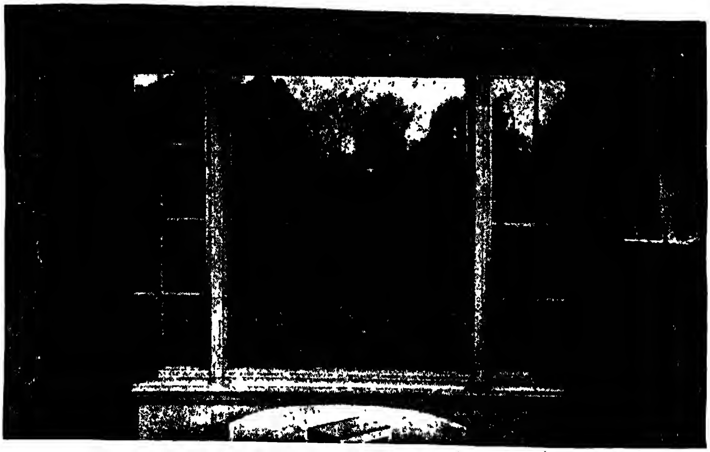


FIG. 11.11. Picture window with double casement windows.

in Figures 11.10 and 11.11, these wide sashes are often set in stationary frames, with narrow casement windows at either end for ventilation.

The installation of this type of window, although requiring a larger opening and consequently heavier framing, is not difficult, provided that certain simple rules are observed. In general, windows having a span of 4 to 6 ft. will require double headers of 2 × 6 or 2 × 8 timber set on edge. Spans of 6 to 8 ft. should be trussed, as in Figure 11.12. In computing the span, the width of the stiles must be taken into consideration; for a fixed window, however, no allowance for sash

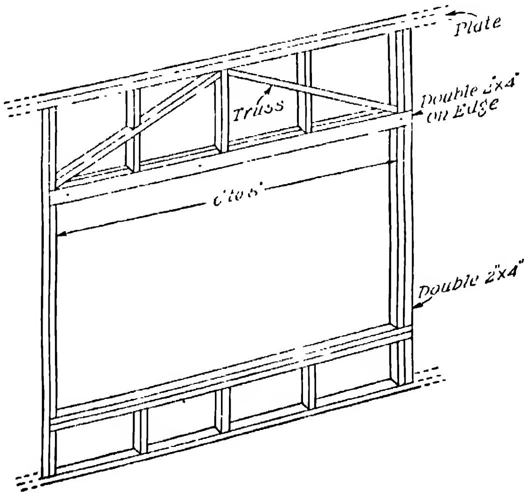


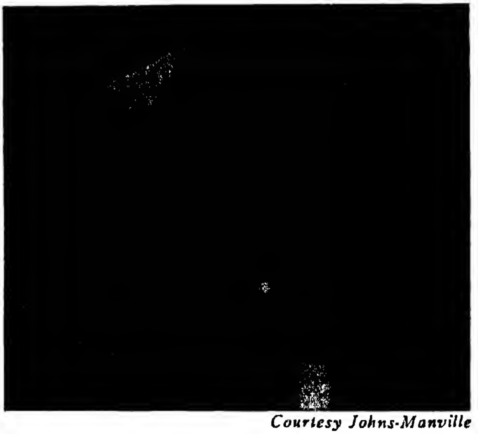
FIG. 11.12. Truss framing for picture window.

weight pockets will be necessary. Single casement windows at the ends of the picture window are installed in much the same manner as doors.

Corner Windows. A recent development, borrowed from modern architectural design to let in a maximum of light, is the corner window, which is nothing more than one window set at right angles to another, separated only by the necessary corner post and trim. A truss reinforcement over each of these corner window frames is a "must" at this crucial point. As indicated in Figure 11.11, the diagonal members are in one piece, with the upright studs cut to fit accurately and toe-nailed into position. If double-hung windows are to be used, spring balances should be employed to eliminate the bulky sash weight boxes on both sides of the corner post. Casement windows which swing outward are ideal for this type of installation.

COVERING AN OLD CEILING WITH A NEW ONE

When a ceiling becomes so badly flaked or cracked that the necessary repairs would be disproportionate to the results which could be reasonably expected, no particular skill is required to cover satisfactorily the old surface. In ceilings where recurrent leakage has caused the plaster to become unkeyed with resulting danger-



Courtesy Johns-Manville

FIG. 11.13. Ceiling with plaster removed.

ous bulges, large areas or perhaps all of the plaster must be removed, as in Figure 11.13. In either case the home mechanic has a choice of several easy-to-apply materials, which will create a smooth new surface over the old eyesore.

Softwood squares of tiles, with beveled edges, are an increasingly popular medium for old or new ceilings. The 12 and 16-inch sizes, with tongue-and-groove or rabbeted joints are most practicable, although oblong sizes, interspersed with squares, make a pleasing effect for large ceilings; multiple sections speed up the work tremendously. The selection of the size tile depends on the size of the ceiling

In general, although the 16-inch stiles are easier to apply over rafters set on 16-inch centers, they are considered out of proportion for the average sized home.

If the plaster of the ceiling to be covered is still firm the application of tiles is a simple matter, because they can be cemented directly to the ceiling with an adhesive supplied by the manufacturer. "Dabs" of the adhesive on each of the corners of the 12-inch tile are sufficient, with an additional patch in the center, when 16-inch squares are used. When using adhesive, it is necessary to press each tile in place firmly, with particular care that the joints are fitted true, in order to insure that the resulting lines or courses run straight in both directions.

Before applying the tiles, the dimensions of the ceiling must be measured and divided by 12 (or 16) to determine whether an even number of rows or courses can be "laid." Even though calculations indicate that an even number will result, it is best to begin in the center of the ceiling and work outward, for, if the walls are not plumb or the corners square, such defects will be absorbed by the last course of tiles. This will insure a centering of all the lines of tile joints.

If the dimensions of the ceiling indicate an odd number of courses in either or both directions, the center tile must be applied so that there will be odd courses of equal width along opposite walls. In this connection it is well to remember, that a most satisfactory method of finishing off the edges of a wallboard or tile ceiling is by means of a cove molding. Therefore, when measuring the number of courses which can be applied, it is possible that deductions for parts of the total coverage afforded by both moldings, may preclude the necessity of additional small odd courses.

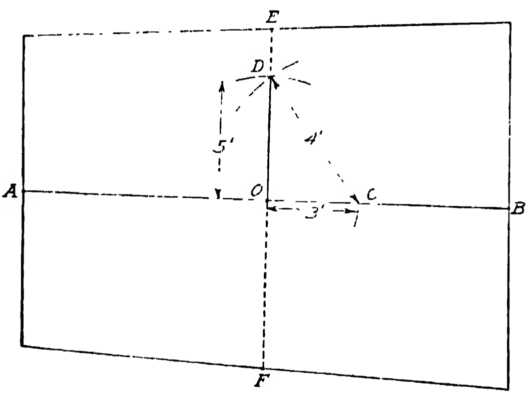


FIG. 11.14. Finding the center lines of an irregularly shaped ceiling.

To insure straight courses, the center points of the opposite short walls of the room (A and B, Figure 11.14), are measured and marked, and a chalk line snapped between them. The line AB is then divided in half at O. Since the walls of the room may not be at right angles to each other, no attempt should be made to

secure a line at right angles to AB by snapping a line between the center points of the longer walls. The familiar 3-4-5 method can be applied by measuring a line OC equal to 3 ft., as in Figure 11.14. With C as a center, using a radius of 5 ft., an arc is scribed beside O. With O as a center and using a 4-ft. radius, the preceding arc is then intersected at D. The line OD is perpendicular to AB and can therefore be prolonged to EF. If two rows of tiles are cemented with their edges along these lines, all remaining courses will be at right angles to each other, regardless of the shape of the room.

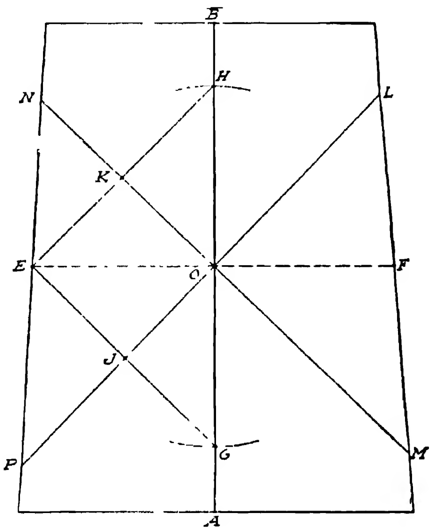


FIG. 11.15. Diagraming the base lines for a diagonal pattern.

The diagonal pattern is a pleasing variation. Using the line AOB of the previous diagram, points G and H are located, (Figure 11.15), equal to the distance OE (or OF). Points G-E and E-H are then connected, (all equidistant from O), and the center of these lines are determined at J and K. The lines are continued through J and K until they intersect the opposite walls at L, M, N and P. Tiles cemented along lines MN and LP will make 45° angles with lines AB and EF. Each course must be cut diagonally with a fine-toothed handsaw where it strikes a wall, causing more wastage from this method, unless considerable care is exercised in fitting in odd pieces.

1″ × 2″ furring strips must be nailed at right angles to the rafters when the plaster is so badly cracked that tiles cannot be cemented directly to it. The ceiling is tapped with a hammer to locate a rafter, and, after determining whether or not they are laid on 16-in. centers, each rafter is marked along the ceiling with

a straightedge, measuring and tapping frequently in order to keep "on the beam." Any bad portions of plaster that seem likely to fall should be removed entirely.

Before nailing on the furring strips, the number or direction of courses should be computed, as explained in the preceding paragraphs. Base lines are drawn and furring strips nailed at right angles (or diagonally) to the rafters, with 12 in.

Courtesy Johns Manville

FIG. 11.16 Installing flanged ceiling tiles

from center to center for 12-in. tiles. Where necessary, the furring strip must be shimmed up when it crosses a rafter at any spot where a large portion of plaster has been removed. There must be furring strips against each wall, of course, to secure the far edges of the last rows of tiles. Tongue-and-grooved tiles have two flat or male portions as shown in Figure 11.16, one of which can be tacked to the furring strip. At the edge of the ceiling abutting the wall, the outer edges of the last course of tiles can be nailed regardless of which side of the tile is available, since the cove molding will cover the exposed edges, if the nails have been placed close to the wall.

Courtesy The Upson Company

FIG. 11.17. Wall board clip.

In the event that all plaster and lath have been removed, or in the case of a cellar or attic where it is nonexistent, and the size of the ceiling warrants 16-in. squares, strips of furring material can be nailed directly to the rafters. Under these circumstances, two sides of the squares can be tacked or clipped (Figure 11.17) in place with 1¼ in. brads for greater rigidity.

Since these softwood squares come with a smooth white surface, no further finish is required. Should leaks, spatterings, insect stains, or smoke make finishing desirable at a later date, calcimine, casein and other cold water paints can be applied directly to the tiles without a previous sizing.

For a smooth ceiling without squares or lines, as a basis for wallpapering, for example, there are varieties of wallboard available that come in 4-ft. widths and in varying lengths. These can be nailed directly to the rafters with nails along the edges approximately 3 in. apart; intermediate nails can be spaced 6 in. All nails are countersunk and covered with patching plaster. To prevent later buckling or warping, however, a ⅛-in. space should be left between the ends of the plasterboard. This can be filled later with patching plaster, plaster of Paris or a mixture of whiting and varnish, then leveled off and feathered with a paint brush dampened in water. If plastered carefully, the joints between sheets and the countersunk nail heads will be almost indistinguishable, less noticeable than if covered with the layer of coarse cloth some manufacturers recommend. Some wallboards come with recessed edges which are applied like shiplap or siding, (See section on Finishing An Attic with Wallboard).

In attaching the sheets of wallboard to the ceiling a "helper" or "T" buck is used to support one end. The work can be done alone, but an assistant is invaluable, at least until each sheet is attached with sufficient nails to bear its own weight.

If it is considered satisfactory to cover the joints between the sheets of wallboard with a batten of lattice-like slat, either softboard, hardboard, or plywood sheets can be used. In such cases additional battens or "moldings" can be added down the center of the sheets and at appropriate places across the width, to create a symmetrical design. Some softboard sheets come finished in tan on one side and cream on the other. They must be sized before applying wallpaper or oil paint. Size is also desirable if calcimine is used; other water base paints can be applied direct.

One other method for covering a ceiling where the plaster remains firmly keyed to its laths, is the application of plastic paint. All cracks must be first undercut and patched, and loose flakes scraped off with a wire brush or a stiff scrub brush. If the ceiling retains vestiges of calcimine, it must be removed with a sponge and warm water. For stubborn coatings, ammonia or washing soda may be added to the water, but any washing soda which spatters the woodwork must be wiped off at once.

Plastic paint has the quality of soft plaster, and is either made by adding water to a prepared plaster, or from a type having an oil base. The latter type of paint is regarded as somewhat heavy for application to ordinary ceilings, but is easy to mix by adding sufficient powdered whiting to oil paint. A variety of textures can be achieved, the simplest method being to apply it by random strokes with a 3 to 4-in. brush, at varying angles. Some prefer stippling with a sponge or crumpled wad of paper. Whatever the texture chosen, if applied properly, it will result in a rough finish that will effectively conceal the ceiling's former imperfections.

APPLYING WOOD PANELING

Whether the home owner desires to securely cover dilapidated plaster walls or simply prefers the soft sheen of waxed pine in his room, vertical 1-inch boards of knotty pine in random widths with V-grooves can be easily installed.

When the boards are obtainable with tongue and grooved edges in addition to the V-grooves, the problem is even simpler. After locating the studding, a sufficient number of boards can be secured to the studs along their entire length to hold the intervening tongue and grooved widths. The latter are nailed only to the ceiling and floor plates.

If the room is an exposed one, it would be well to take advantage of this opportunity to insulate it further by first lining it with a good building paper. In a room subject to dampness, this extra insulation will also serve to keep out moisture, which would eventually warp the pine boards. Tap the entire room for the 2×4 studs, usually on 16-in. centers, and mark them plainly on the wall or its paper lining with chalk.

Unless the home remodeler wishes to try his hand at refinishing the door and window trim in imitation of the final finish of the pine walls, the next step is to tear off all window and door trim and replace it with pine. The new trim can be mitered at the corners, and, unless it is thicker than the boards to be applied to the walls or is shimmed out by additional trellis slats all the way around, it will set flush with the new wall, which is not an unpleasing effect.

The secret of successful knotty pine "paneling" is to vary the widths so that they are truly random, with no recurrent pattern or sequence. In the method under discussion it would be expedient if the widths were so arranged that they joined or met at the studs, so that they could be secured by concealed nailing along the tongues, as in flooring. Since this is well-nigh impossible, finishing nails are used on the surface of the boards, then countersunk and later, puttied or beeswaxed, after the stain has been applied.

To insure a satisfactory effect with random width boards it is highly desirable to mark the location of each board before nailing it in place. In making the layout, two planks of the same width are seldom placed side by side. It is considered good practice to locate boards of equal widths on either side of a window or door, as well as at outside or inside corners. This leaves the area between to be proportioned into the available widths.

A right-handed worker will prefer facing the tongues to the right, starting in the left corner of the room with a length nailed to the corner studding. The sections which fit to the next stud are then laid and cut to proper length, using the preceding one as a templet for its neighbor. Each tongue should be fitted tightly into its groove by rapping it smartly with a hammer insulated by a tongued scrap. The widths between those anchored to studs can be secured to the top plate near the ceiling, and to the shoe close to the floor. Warped lengths should be discarded, and only those pieces used that extend from floor to ceiling, except

where the wall is masked by bookshelves or other built-in devices. Corners must be solid, which will usually require ripping at least one board for its full length.

The tops of the siding can be finished with a suitable cove or crown molding such as illustrated in A of Figure 11.18. If time and patience permit, a dado consisting of a pine board whose bottom edge is cut into 1-in. squares, as in B of Figure 11.18, can be fastened along the tops of the walls before the crown molding

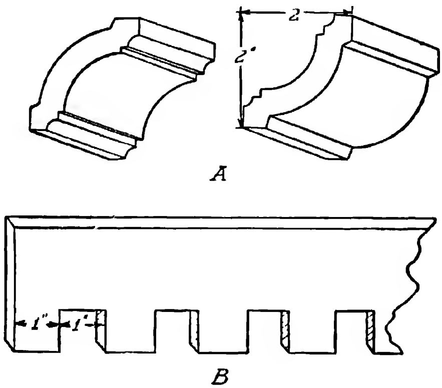


FIG. 11.18. *A*, Cove molding; *B*, Colonial dado.

is applied, for an authentic Colonial effect. A baseboard may be provided, either of plain beveled pine or surmounted by a simple molding. Often the baseboard is omitted, and the bottom ends finished with 1 in. quarter-round molding.

Clear grained pine can be installed effectively in the same manner and finished in various ways, as will be explained later.

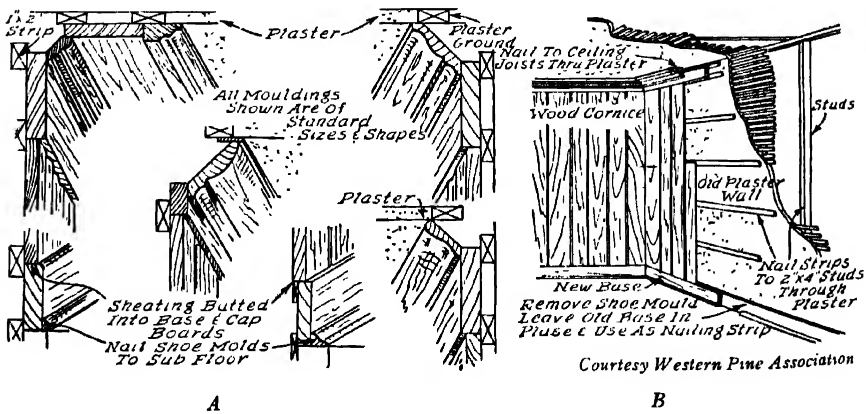
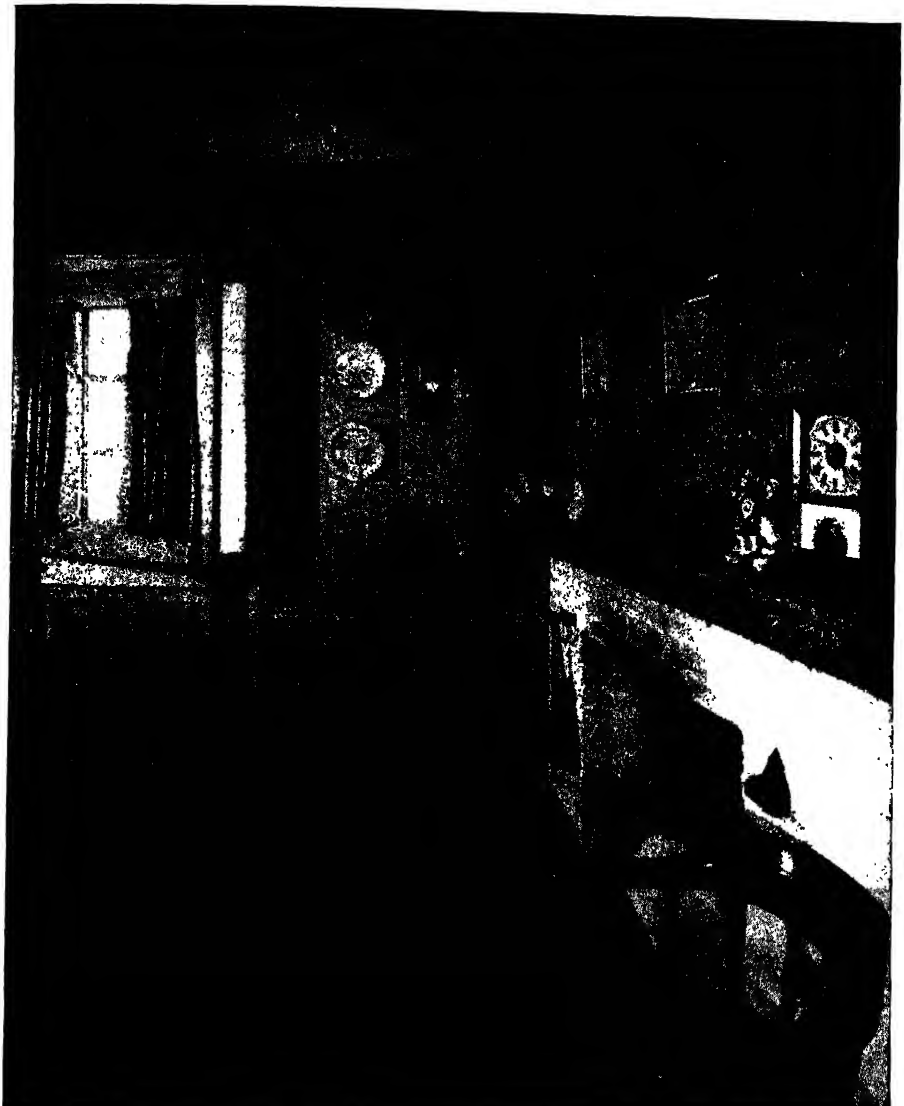


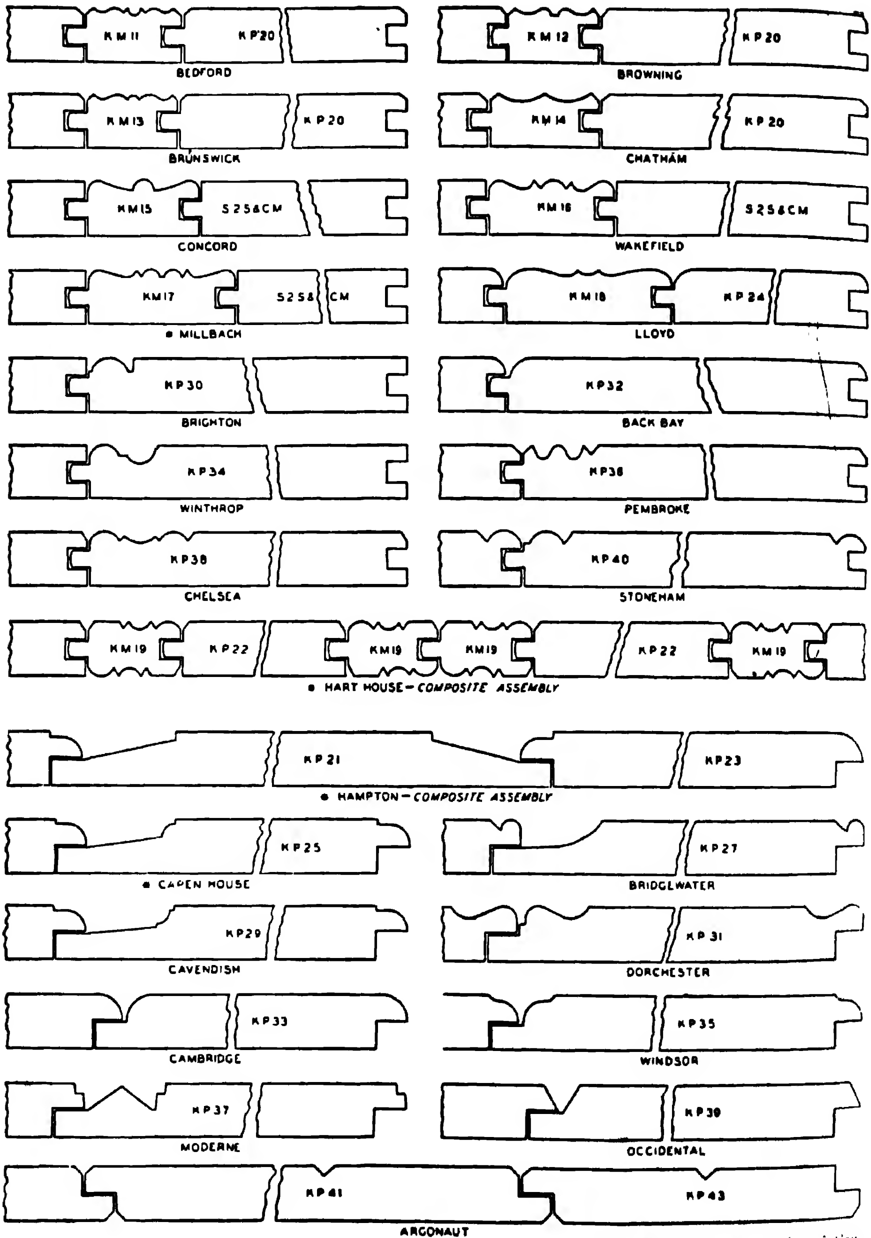
FIG. 11.19. *A*, Base and cornice treatments. *B*, Applied over old plaster walls.

Furring Strips. A more substantial method of installing vertical pine boards to the walls of a room is to provide a series of horizontal furring strips for nailing. As indicated in Figure 11.19, the furring strips are nailed to the vertical studding through the old plaster at 1- to 2-ft. intervals with extra strips near the floor and



Courtesy Western Pine Association

FIG. 11.20. Knotty pine in vertical and horizontal board.



Courtesy Western Pine Association

FIG. 11.21. Details of pine paneling patterns.

ceiling to accommodate a baseboard and deep crown molding, if contemplated.

To install the furring strips, the walls will have to be tapped first to determine whether the studs are spaced on regular 16-in. centers. Once this has been established, the remaining studs can be located and marked with a ruler by driving finishing nails into three of the studs and measuring. Although it is not important that all furring strips be exactly level and equidistant (so long as they are nailed to each stud), they can be easily located by snapping horizontal chalk lines around the room. Door and window trim must be shimmed out to the combined thickness of the furring strips and the siding.

If tongue and grooved or ship lap material is used, it can be applied like flooring, with concealed nailing. This is accomplished by starting the nails where the tongue leaves its shoulder, driving inward at an angle of 40°. No attempt is made at first to drive in the nail all the way because a nail set is used later to prevent marring the edge.

Small rooms can be given the illusion of increased size by nailing the pine planks horizontally. This will only be practicable where the boards are obtainable in lengths equal to the widths of the walls, or sections of the walls between openings or built-in conveniences, since otherwise their end joinings will be visible unless a concealing molding is applied. Under such circumstances horizontal boards can be applied horizontally to chair rail height as a wainscoting, the remainder of the wall being covered with vertical siding, as in Figure 11.20.

Paneling. For the home worker who has the patience, tools and a medium-sized wall space to cover, the rich effect of pine paneling will well repay the time and workmanship required. By using any of the stock patterns shown in Figure 11.21 much labor can be saved without sacrifice of appearance.

As mentioned in the preceding chapter, modern decorating trends approve a paneled effect in one or more walls of a room with the others papered, painted, or wainscoted. When such a choice is to be made, a wall that contains a fireplace is an obvious project for paneling, examples of which are illustrated in Figure 11.22.

There are several methods used in constructing raised paneled walls, the one adopted often being a compromise as the result of available material. One of the most common types is the familiar stuck panel construction, with the panels as thick, or nearly as thick, as the stiles and rails, but beveled off to a thin edge for insertion into their dadoes, as was the case with the door of the Corner Cupboard in Chapter 2. This construction is also very similar to the Hampton Composite Assembly shown in Figure 11.21. Sections of ¼ or ⅜-in. surfaced plywood or wallboard having a good imitation surface, either as furnished by the manufacturer or covered at home with one of the plastic film transfers described in Chapter 5, can be fitted into dadoes in the stiles and rails, or bradded into rear rabbets and finished off in front with mitered moldings.

Whatever the chosen design, it is obvious that a plan or rough sketch is essential, not only for estimating the amount and kind of material required, but to prevent openings or interruptions in the wall from destroying the symmetry

of the paneling and, of primary importance, to insure that the studs under the plastering can be used as supports if furring strips are dispensed with. So long as they are not fully encased (separated from the surrounding wood), knots in the stiles and rails are considered as decorative as those in the panels. Fully encased knots should not be used in any lumber because they are liable to loosen and fall out.

Courtesy Western Pine Association

FIG. 11.22. Paneled knotty pine.

Finishing. As with all woods, the light natural color of pine darkens somewhat as it ages, especially in the heartwood. The soft glow of the century-old pine seen in old New England homes is the result of a slow oxidation of the surface fibers through long exposure to air and sunlight. This "sun-tanning" process brings out the patina which adds a depth of tone achieved only with the passing of time. It is a natural desire to try to emulate this beautiful weathered effect in a modern installation.

In general, some shade of brown is the most authentic and, consequently, the most popular stain for knotty pine. Light shades are preferred that do not obscure the varied knotty effects or the latent appeal of the grain. Light stains are particularly important in dark rooms, especially basement rumpus or recreation rooms where limited outside light is available. The popular warm, clear, pumpkin-brown shade makes a rich background for Early American or Colonial furniture, whether

the walls are finished informally in vertical or horizontal siding or with the more formal paneling described in the preceding section.

The trial-and-error procedure is almost essential in mixing a stain that will satisfy individual preferences in the matter of warmth, which is so basic a factor in the determination of light and background. Scraps or the back of the lumber should be used when testing the effect of the new stain. As previously stated, the puttying of nail holes should be delayed until after the stain has been applied, because the oil in the putty is liable to leave rings unless an oil stain is employed. For this reason many decorators prefer beeswax or a tinted, nonshrinking crack filler.

Another safeguard against later dissatisfaction is to stain the tongues of tongue-and-groove or ship-lap lengths before nailing them into position, thus avoiding the exposure of raw wood in case of shrinkage, as well as reducing the possibility of dirty fingermarks during installation. If the lumber arrives with heel marks, rust stains, pencil marks or with mill identifications stamped upon its finished surfaces, the blemishes can be quickly sponged off with TSP, (trisodium phosphate from the paint or hardware store), using a solution of two heaping teaspoonsful to a gallon of lukewarm water.

The application of stain, sealer, and varnish, lacquer or shellac and wax finishes is covered in Chapter 5. The various stains and finishes in vogue for pine are listed as follows by the Western Pine Association, whose member mills manufacture Idaho white pine, sugar pine, and ponderosa pines:

Oil Stains

Clear Pumpkin Brown, as one of the most popular shades, is composed of burnt sienna mixed in boiled linseed oil thinned with turpentine and cooled with a trace of ultramarine blue. After a single application has dried for 24 hrs. it can be sealed with shellac and waxed.

Honey (yellow) brown is made from the same formula except for a slight increase in the ultramarine blue.

Light red brown uses Vandyke brown with a dab of ultramarine blue in boiled linseed oil with japan drier. The shellac sealer can be Simonized, with a sanding before and after application.

Yellow brown results from a thin coat of yellow ochre mixed in boiled linseed oil and toned down with burnt sienna and a small amount of ultramarine blue. The mixture can be thinned with gasoline and sealed with two coats of white shellac, sanded.

Beige is an effect obtained by the application of a coat of zinc oxide and lithopone mixed with China wood oil and tinted with a trace of burnt sienna. Being self-sealing, it can be waxed when dry.

Antique tawny brown features a good grade of light oak oil stain, followed by

a coat of flat gray paint which is wiped off before it dries. Old English wax or any good wax darkened with umber will complete the finish.

Water and Alcohol Stains

Red brown on genuine white pine is a water stain which is applied after the grain has been raised by sponging with water and then sanded flat. The stain is composed of chloride of iron in water and is also sanded after drying. A shellac and wax finish is recommended

"Café au lait" Old World finish, as its name implies, utilizes coffee to obtain its basic tint. Over a water-clear lacquer sealer of 1 part of lacquer to 1½ parts of lacquer thinner, a glaze consisting of a strong brew of coffee is blended out with cheesecloth, repeating until the desired shade is obtained. After a light sanding with 7/0 paper, an overtone is applied to any patterned or raised surface with an alcohol stain mixed from Du Pont's alcohol-soluble fast scarlet, fast orange and Grand Rapids' jet black. A dusty finish is imparted by adding rottenstone to the final wax application.

English finish is the term applied to a thin coat of glue size that has been colored with raw sienna, a small amount of raw umber, and a trace of Venetian red. After drying 24 hrs., its tone can be softened by wiping with a damp cloth wrung out from warm water. Once sealed, it can be covered by flat varnish or lacquer.

Cocoa color is a rather rich dark finish secured by applying a coat of coloring similar to the overtone used in the "café au lait" finish. It consists of 3 parts of alcohol tinted with Du Pont's fast scarlet, fast orange, fast yellow, and jet black, mixed with 1 part of white shellac. After rubbing (when dry) with 3/0 steel wool, the clean surface receives two coats of water-clear lacquer, then wax.

Pickled pine, as a finish, may vary from olive-green gray to driftwood gray, according to preference. Following the application of a good commercial bleach, the surface is antiqued with a coat of paste-white distempered with raw umber and drop black. It is then wiped to leave a dust-like coating which can be sealed with shellac and waxed.

Acid Stains

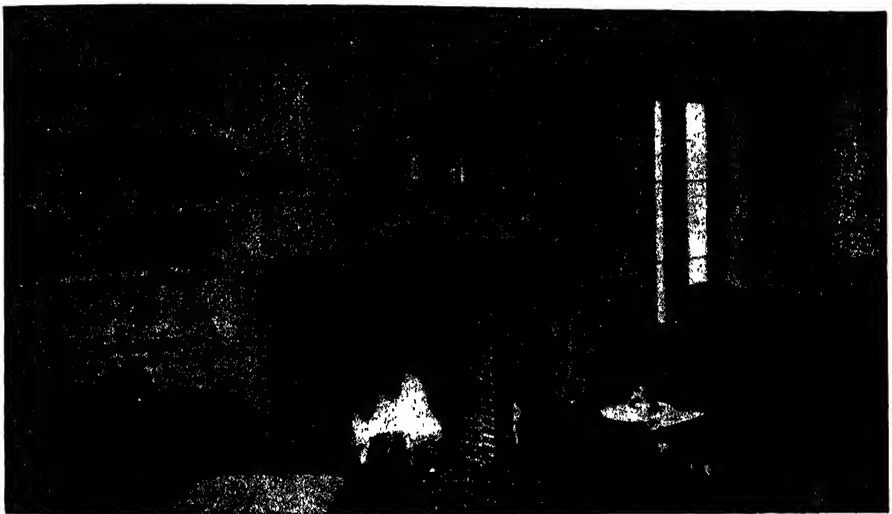
These stains are best applied after the surface has been washed.

Gray. The grain is raised by sponging with water to which a little ammonia or vinegar has been added, then sanded, after drying. The stain is made from common nails "soaked" in vinegar for at least 24 hrs. When applied, the surplus stain is wiped away from lapped edges and then sealed, sanded, and waxed with Old English Paste Wax or its home-mixed equivalent.

Yellow brown is obtained by following the same procedure, substituting an acid stain containing chromate of potash.

Thinned Undercoater Paints

White-limey is a very popular finish in southern climates. It consists of a coat of flat white lead tinted an off-white and thinned to priming coat consistency, which, while still wet, is wiped off the knots with clean cheesecloth. After 24 hrs. of drying the wiped areas over the knots are feathered by sanding, and the grain indistinctly disclosed, where desirable, by further judicious sanding. A coat of shellac, varnish, or lacquer completes the finish. Known as "rubbed white" or



Courtesy Western Pine Association

FIG. 11.23. Rubbed pine with knots showing through.

"white with knots showing through," this finish, as illustrated in Figure 11.23, is a clean, cool finish that can be shaded with any of the siennas, umbers, greens, yellows, reds or blacks, as desired.

Blonde. Basically similar to the white-limey finish, a blonde effect differs essentially in the amount of thinned paint permitted to dry on the pine surface. With an undercoater of priming consistency, a blonde coloring can be obtained by wiping off the entire surface within 10 to 20 min. after application.

Two-tone (brown over golden). One part zinc undercoater is tinted with dark chrome yellow pigment and mixed with 3 parts of boiled linseed oil, with a pint of turpentine added to a gallon of the mixture. Applied as a priming coat, it is let dry for 24 hrs. and lightly coated with a dark oak stain reduced 25% with boiled linseed oil, and highlighted. After sealing, flat varnish or lacquer can be applied for a durable finish coat.

Driftwood gray results when a thin white undercoater, distempered with raw umber, is grayed with a trace of chrome green.

Tinted Lacquers and Varnishes

Light amber is a thin raw sienna glaze carefully blended out over a coat of thin clear lacquer. Before waxing it must be protected by a coat of clear lacquer.

Pale golden brown is produced by mixing a good grade of light oak stain to which a trace of white lead has been added, with a clear flat varnish. One coat is sufficient before waxing.

Bleached Finishes

Another means of securing the so-called "blonde" finish is by bleaching. Commercial bleaches are the strongest, but, for a basically light wood like pine, the surface fibers can usually be sufficiently whitened by using a saturated solution of oxalic crystals in hot water, or such household cleansers as Clorox or Purex. The "bloom" from the oxalic solution can be removed with alcohol. After sanding where necessary, a natural finish of water-clear lacquer is applied as a protective coat.

Unless the walls are subjected to particularly hard usage, an occasional cleaning with a damp, soapy cloth can provide the necessary maintenance. Once cleaned, a protective film of paste wax or self-polishing wax will prevent stains.

Cypress. From the swamps of Louisiana, Florida and Georgia comes tidewater red cypress, which has gained merited popularity as interior trim. It is particularly effective for informal backgrounds when applied vertically in the same manner as knotty pine, which it closely resembles when selected from knotty

Courtesy Southern Cypress Mftrs. Ass'n

Fig. 11.24. Bird's-eye Cypress interior.

stock. As with pine lining, cypress comes in various widths and in a wide selection of molded edges, as indicated in Figure 11.24. For those who especially admire old weathered effects, the "pecky" cypress provides an interesting medium. As illustrated in Figure 11.25, these pockets are pitted in the wood by local decay, and are not the result of skillfully applied acids or other artificial tamperings.

As with pine, the surface to be finished must first be sanded quite smooth. With few exceptions, the finishes listed for knotty pine walls can be applied, with discretion, to cypress. In addition to the desirable natural (untinted) finish, the Southern Cypress Manufacturers' Association recommends the following treatments.

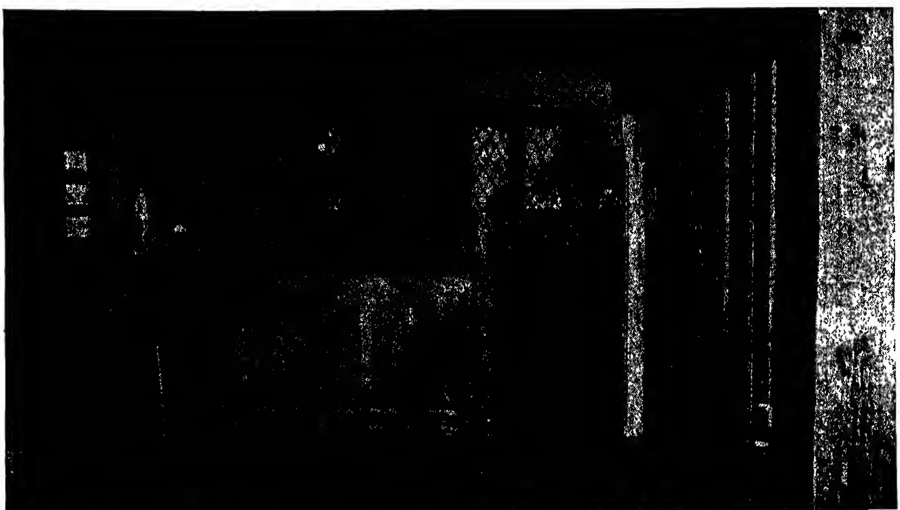
Light gray finish obtained by one coat of gray oil stain, followed by white shellac, gloss varnish and dull varnish coats in turn.

Weathered effect is an antique finish secured by applying a mixture of 1 tablespoonful of floor wax to ½ pint of rottenstone dissolved in enough gasoline so that it will paint freely. After wiping across the grain, it is covered with a coat of wax and rubbed lightly.

Bird's-eye or curly grain cypress should receive a very thin coat of walnut stain, followed by a coat each of shellac, gloss varnish, then dull varnish.

"Pecky" cypress offers an interesting opportunity because of its pockets, as will be noted in the following recommendations. In all cases the pockets must be cleaned out thoroughly with a wire brush to remove any accumulated powder before the finishing operations commence.

Driftwood effect results from antiquing the pecky pockets by applying a coat



Courtesy United States Plywood Corporation

Fig. 11.25. Pecky Cypress basement bar.

of hydrated lime to the surface and rubbing it down with burlap. It is protected by a wax film when dry.

Brown pecky effect highlights the pockets by proceeding as above after sealing with white shellac.

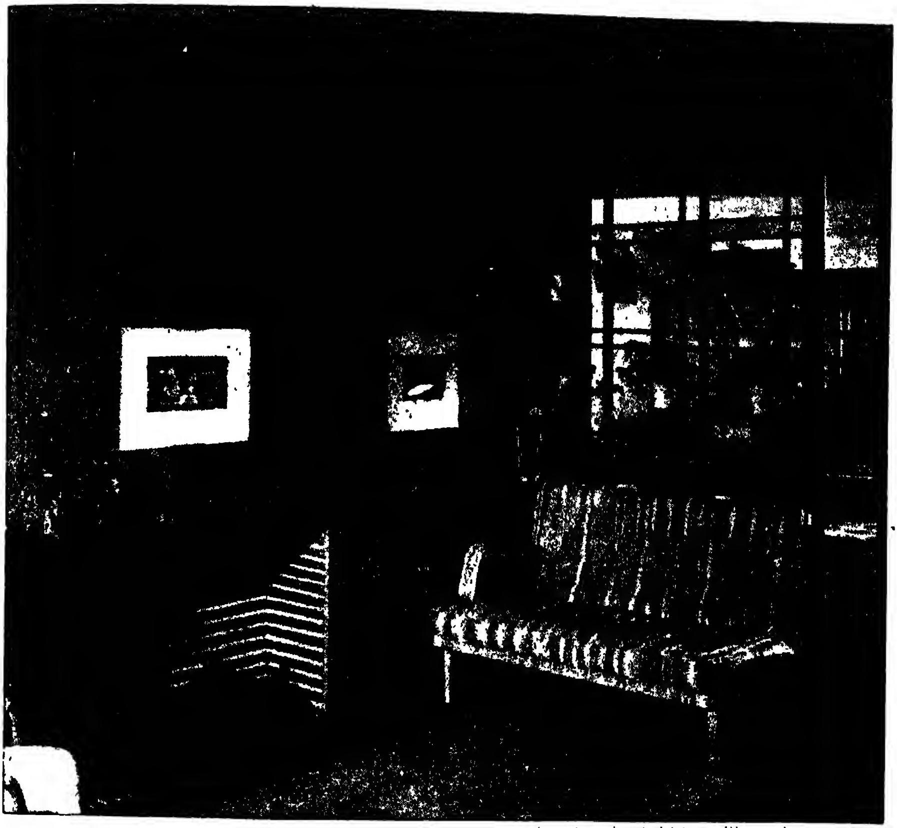
Antique effect. After the usual careful brushing, a very thin coat of walnut asphaltum stain thinned with gasoline is applied. Before it has had time to dry, however, it is rubbed vigorously with cotton waste, dipped in pumice and water, to bring out the highlights. After drying, the surplus pumice is brushed or wiped off and the surface waxed.

Miscellaneous Wall Coverings. As mentioned in previous chapters, sheets of plywood are available with their faces veneered in handsome wood grain effects. Provided the wall surface is sufficiently smooth, or suitably built-up with close-set furring strips, the application of these sheets, in many cases, requires little more than a dependable glue such as Bakelite cold-setting resin glue, BC – 17613, USP Resorcinol, Casophen or MMM. A variety of rich effects can be obtained by applying the plywood sheets vertically without visible seams as illustrated in Figures 11.26 and 11.27. Some craftsmen prefer a simulated panel effect by concealing the seams under wide pieces cut from the plywood sheets of the same surface, using narrow moldings to cover the exposed edges.

In addition, wallboards are now being manufactured with finishes that closely imitate rich wood grains. Knotty pine, one of the more difficult effects to reproduce, is shown photographed in Figure 11.29B. The use of wood grainings, photo-

Courtesy United States Plywood Corporation

Fig. 11.26. Mahogany Plywood applied vertically.



Courtesy United States Plywood Corporation

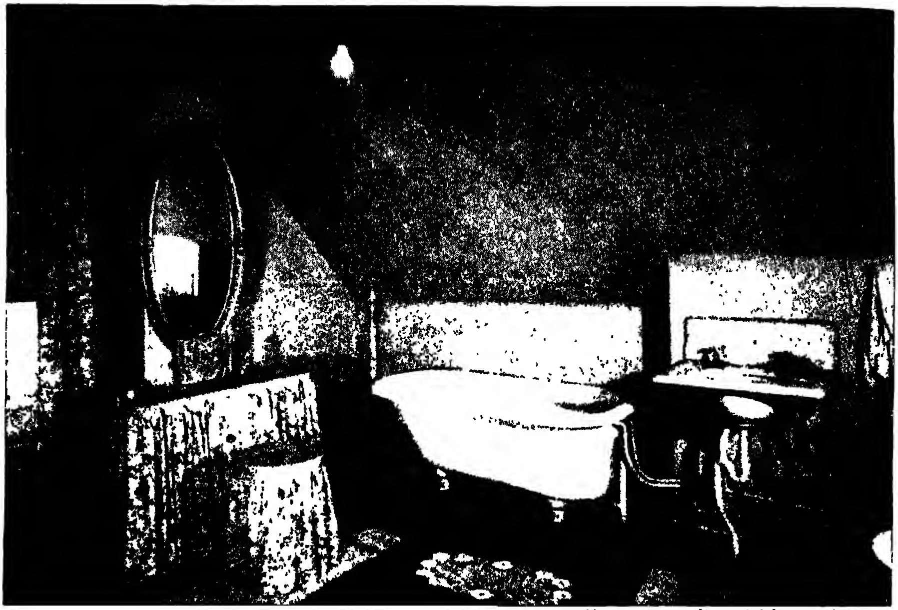
FIG. 11.27. Square treatment with walnut plywood.

graphed on plastic film that can be transfered to a cheap wallboard background, has brought rich hardwood effects within the moderate cost budget. With these various materials to choose from, the home remodeler can select his effects to suit his purse, secure in the knowledge that a careful installation will yield a satisfying reward.

MODERNIZING THE BATHROOM

No magic wand other than the usual tools available to the home mechanic is required to transform that ugly duckling, the average old-fashioned bathroom, into a sleek, shining modern version. The replacement of out-of-date fixtures, such as those pictured in Figure 11.28, is a most desirable initial step. If all these fixtures cannot be replaced, every effort should be made to remove the overhead tank type of water closet, both the ugliest and most difficult to repair of bathroom fixtures.

When enough space is available, the morning choke point that results from using a single bathroom can be alleviated, as well as additional privacy secured, by partitioning off the toilet or both the toilet and lavatory. The addition of another lavatory in the tub or shower room also can be of great help.



Courtesy U. S. Gypsum Remodel Research House

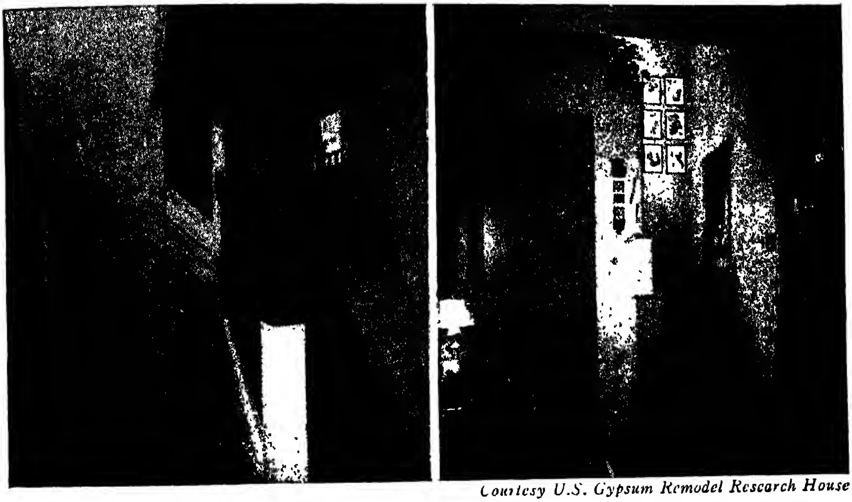
FIG. 11.28. Old style bathroom.

A large closet converted into a small bathroom has solved many a family's early morning traffic problem. Examination of upstairs and downstairs hallways often reveals waste space or little-used closets under the stairs that can be made into small powder rooms with a minmum of additional construction. A and B of Figure 11.29 show the "before and after" stages in the actual extension of waste space in a hallway. The installation of this type of convenience will yield rewards in gracious living well worth the labor and cost involved. For planning purposes, the average sizes of bathroom fixtures are illustrated in the section Finishing the Attic with Wallboard, on page 548.

Modern hard wallboards, $\frac{1}{8}$ to $\frac{3}{16}$ in. thick, are available already scored into 4, $4\frac{1}{2}$ and 5 in. tiles of various glossy colors, with contrasting joints. These tile boards come in 4-ft. sheets up to 12 ft. long and can be cut with an ordinary crosscut handsaw. If the plaster is in good condition, the tileboard can be cemented directly to the walls by means of dabs or patches of the manufacturer's adhesive applied to the wall at 6- to 8-in. intervals.

Before applying the tile board, the wall should be checked with a straightedge

for high spots, which must be leveled. Bad breaks and loose plaster must be removed, and the exposed lath evened up with the surrounding plaster by means of shims or pieces of wallboard. In marking the upper level of the horizontally applied sheets of tileboard, it should not be taken for granted that the floor is



Courtesy U.S. Gypsum Remodel Research House

FIG. 11.29. Converting waste space in hallway, "before" and "after."

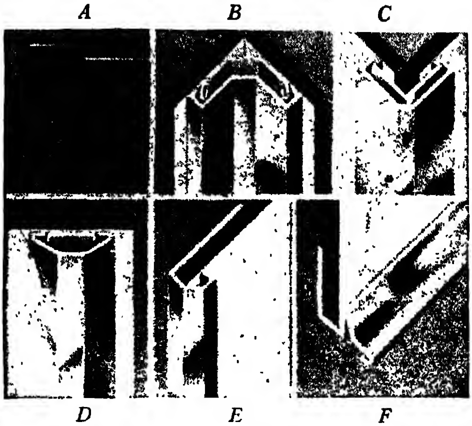
level throughout. This can be checked by applying a level along the top of the baseboard to locate the low spot in the room, if any.

The existing baseboard can be enameled black and tileboard mounted directly above it, in which case a mark is made 4 ft. above the top of the baseboard at its lowest point. This is extended into a horizontal line around the room by means of a straightedge and level, or a snapped chalk line between leveled points. If it is preferred to replace the old baseboard with a rubberized, plastic, or other type of cove molding, the old baseboard should be gently pried off with a pinch bar, and the new molding cemented or nailed in place before measuring upward from the low point. Each sheet of tileboard is held or tacked in place with its top edge along the horizontal line on the wall, and the bottom edge marked or scored if it overlaps the baseboard. After sawing off this excess piece the first sheet of tileboard can be cemented into position.

Exterior and interior corners can be neatly concealed by chromium finished or colored plastic snap-on moldings or edging strips of the type shown in Figure 11.30. A cap molding, generally in black, is used to set off and conceal the top edge of the tileboard.

Wall fixtures. Before applying the tileboard, all recessed or screwed-on fixtures, such as towel racks, soap dishes, tissue holders, or toothbrush racks, should be

located on the walls so that the proper cut-outs can be measured on the tileboard. These measurements must be exact so that the apertures, when chiseled out or cut with a compass saw from a large hole bored in the corner, will coincide with the holes in the wall. When fixtures are to be screwed onto the wall, it will be easier to locate wooden blocks in the lath and plaster than to drill and insert



Courtesy Montgomery Ward

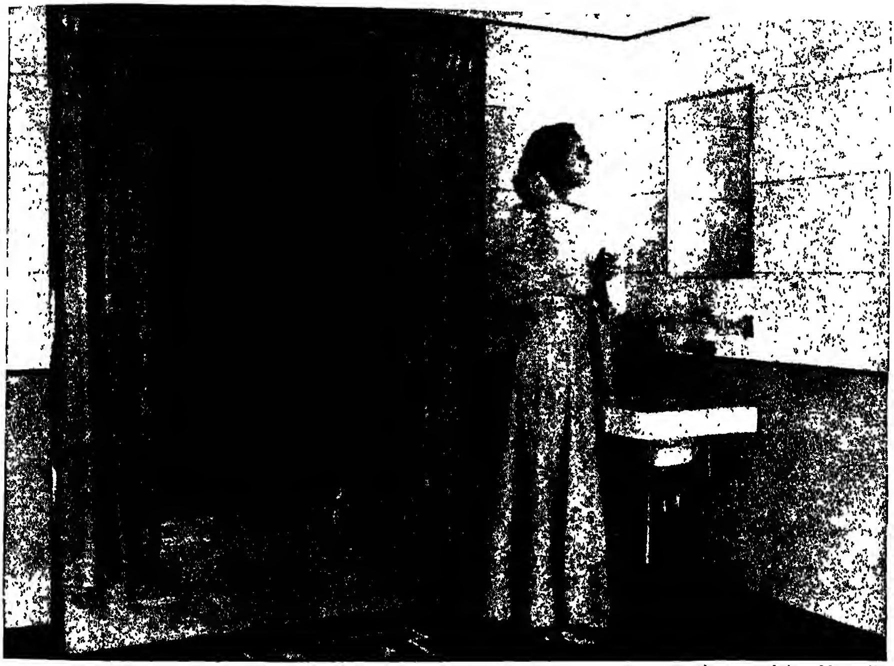
FIG. 11.30. *A*, Masonite Cap and Base Trim. *B*, Stainless Steel Inside Corner. *C*, Stainless Steel Outside Corner. *D*, Stainless Steel Divider. *E*, Stainless Steel End Molding. *F*, Stainless Steel Bathtub Molding.

toggle bolts after the tileboard has been applied. Recessed fixtures are easy to install by cutting the required hole in the lath and plaster and stuffing it with crumpled newspaper or excelsior before cementing the tileboard in place. After the tile has set, the hole is filled with cement mortar and the fixture pushed firmly into position, flush with the wall. Large wall fixtures such as sinks should be removed before applying the tileboard. If this is not practicable, a templet of wrapping paper can be folded and cut into place, to be later transfered to the tileboard at the proper point.

The wall above the cap molding on the tileboard can be covered with unscored sheets in the same or contrasting colors, with chrome or plastic moldings or edgings between sheets to conceal the joints, as illustrated in Figure 11.31, or the wall can be papered in a marine motif or simply painted or enameled. If desired, decalcomania or stenciled designs of seahorses, fishes, sailboats, or mermaids can be applied at measured intervals to the painted surface.

When it is preferable to run the tiled walls up to irregular heights or beyond the 4-feet level, there also are available individual metal tiles with baked-on colors, which can be cemented singly to the walls in various heights or designs. This

metal tile can be cut with an ordinary pair of tin snips to fit corners or around fixtures and, when carefully applied, closely resembles ceramic glazed tile. A narrow width in black can be used to finish off the top course, which can be carried up and over the medicine cabinet or other high wall fixtures to form a distinctive pattern.

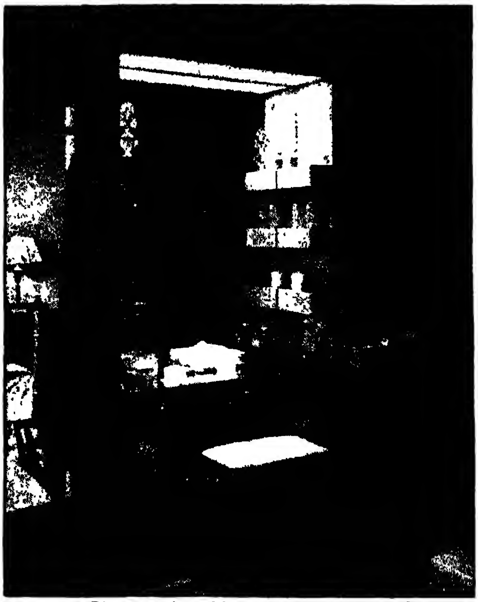


Courtesy Johns-Manville

FIG. 11.31. Interesting treatment with larged tiled effect of different shade against horizontally scored lighter walls.

Before finishing the wall above the tiled portion, all built-in fixtures, such as medicine cabinets, vanities, or closets, such as are illustrated in Figure 11.32, should be installed, together with the side lights. Since the studs will probably be on 16-in. centers, it will be necessary to cut across at least one and install headers, after removing the lath and plaster as explained in the first section of this chapter. Rather than accept the standard-size cabinets commercially available, it is no difficult matter to construct one to suit a particular need.

The size of such a cabinet will often be determined by the mirror available. Using a backing of ¼-in. plywood, a 2- to 3-in. mitered casing can be constructed into which the mirrored door can be hinged as in Figure 11.33. Shelves of ⅜-in. material either can be dadoed permanently in place or provision can be made for raising or lowering them by means of a series of holes an inch apart, into which



Photograph by Makers of Armstrong's Linoleum

FIG. 11.32 Built-in bathroom conveniences.

short dowels can be placed as supports. The mirror is framed (as explained in the section devoted to Picture Frames in Chapter 2) and hinged to the casing. A glass knob and a cupboard catch complete the job, which after several undercoats is enameled white and nailed with countersunk finishing nails along both headers directly over the lavatory.

This centrally located mirrored cabinet should be well lighted on both sides. To guard against a possible short circuit through the body when standing on a

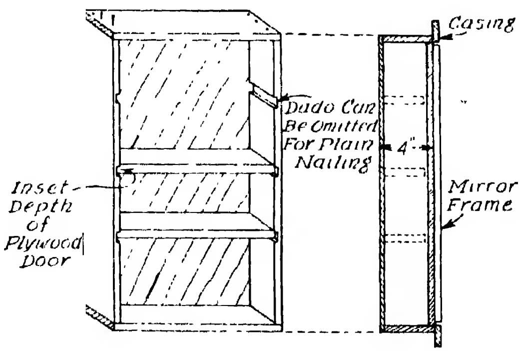


FIG. 11.33 Constructing a medicine cabinet.

wet floor, bathroom fixtures should be controlled by wall switches and not by pull chains or key sockets. Fluorescent or lumoline tubes, set vertically on either side of the mirror in chromium sockets, make excellent modern lighting features. At least one of the sockets should have a convenient outlet for electric razors, curling irons, vibrators, or sunlamps, although nowadays many owners prefer to mount permanent sunlamps in the bathroom ceiling, so that they can receive maximum benefit from them when bathing or shaving. Milady's infra-red lamp for drying her hair can be similarly installed.

If an electric radiant heater is used in the bathroom, it is an excellent idea to provide a permanent recess in the wall to keep it off the floor and out of the way. This can be an ordinary plywood backed open box frame, with casing, which can usually be inserted between studs, unless the heater is unusually wide.

Lavatory. As illustrated below, an old-style legless porcelain or marble lavatory can be modernized by enclosing it with a plywood frame and shelves to form a

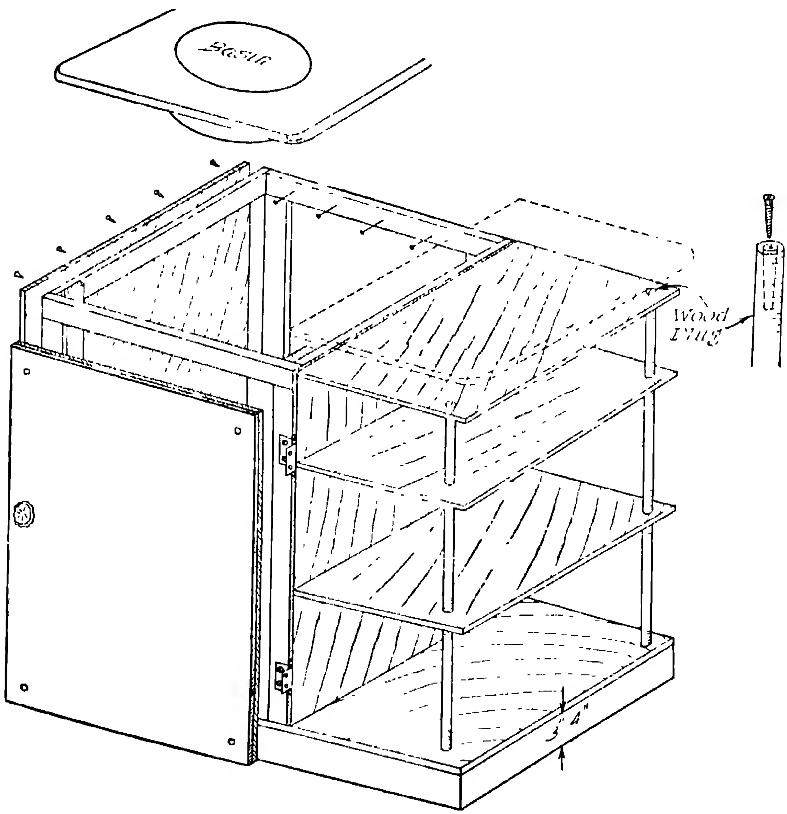


FIG. 11.34. Camouflaging an old-style lavatory.

Pullman basin. With a square-topped basin the project is relatively simple, for both the top and bottom framework can be square. A basin with a rounded edge can be fitted with an hexagonal frame or, if its size permits, supplied with a rounded plywood cabinet in the manner to be described in the following section on Bringing the Kitchen Up to Date.

The 3-in. base is first nailed or screwed to the wall and the 3/8-in. plywood bottom bradded into place. Then the frame of 1 in. $\times$ 2 in. material is slid into position and nailed to the wall, after which the plywood sides are fastened in place. The outside shelves can now be attached by screws from the inside of the side panels, supported on their outer edges by lengths of 3/4 in. black plastic rods, chromium plated tubing, or electrical conduit, fitted with wood plugs at extreme tops and bottoms for fastening, as shown in the inserts. The lowest rods must be attached to the plywood bottom before it is attached to the base. The plywood door supports a plate glass mirror against a layer of felt by means of four nickel-plated bolts and a glass door knob. These five holes can be ground with an ordinary bit brace, using a drill made by grinding down the blunt end of a three-cornered file into a pyramidal base. The location of each hole should be surrounded by a circular dam of putty, filled with turpentine and emery dust. The glass to be drilled is placed on a piece of white paper and only a slight pressure is exerted until spots of turpentine on the paper warn that the drill is breaking through. The glass is then turned over for a smooth completion of the hole from the other side. A cheaper type of mirror can be mounted in a molding against the plywood door.

The top shelf can be of black bakelite or cut from a plate glass mirror. If enough space is available, identical shelving can be built to balance both sides. The closed cabinet in the center not only conceals the plumbing, but is ideal for housing cleaning materials, toilet tissue, and a "plumber's helper," or suction pump.

Bathtub. The next fixture that can be effectively modernized by the exercise of patience and care is the old-time four-legged bathtub. Usually the faucet end of the tub is against a wall, on which 2 $\times$ 2's or 2 $\times$ 3's can be nailed as strong furring to provide a framing for tileboard, which should extend well into the middle of the bathtub's rim. The same treatment is accorded the side wall, to bring the tileboard's lower edge onto or slightly beyond the center of the curving rim of the tub. If the rear of the tub is at some distance from the rear wall, as is often the case, a partition of 2 $\times$ 4's will be necessary. These studs can be notched over a narrow bathtub rim, otherwise additional furring must be added to bring the tileboard's lower edge well onto the rim. At the bottom of each furring strip around the three sides of the tub a thin shim or upper portion of a shingle should be tacked, so that the lower edge of the tileboard bends outward, toward the tub's rim, to insure the drainage of any water splashed on the walls.

Before the blocking strips shown in Figure 11.35 are added to the corners, they are packed tightly with excelsior, newspapers, or other material and a layer of plaster of Paris applied approximately 1/2 in. below the level of the rim. The front frame can now be built, with rounded corners, as explained in the next

section of this chapter, using tileboard or unscored hardboard instead of plywood. A baseboard, matching the rest of the room, is nailed to the bottom.

Whether or not a shower has been installed, an interesting treatment of the newly built-in tub's cubicle is to run the tileboard up vertically on all three sides to a shallow dropped ceiling of 2 × 2's, on which a soft wallboard ceiling is nailed, as in Figure 11.35. A more enduring method is to cover the furring strips with

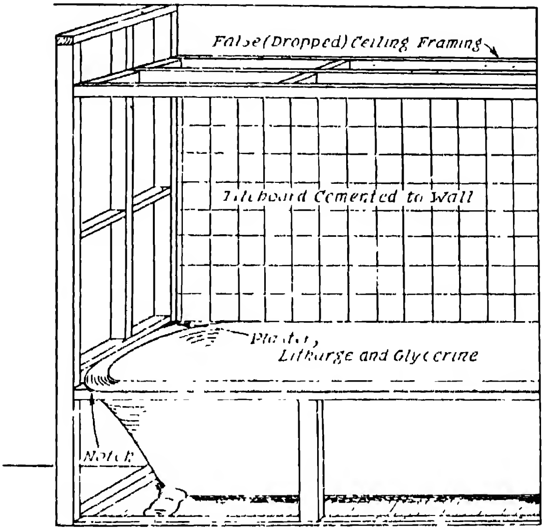


FIG. 11 35 Concealing an old fashioned bathtub

plasterboard and then to cement individual metal tiles on all three walls. These tiles can be of a contrasting color to the other tiled walls of the bathroom. A chromium rod across the front will support a waterproof curtain.

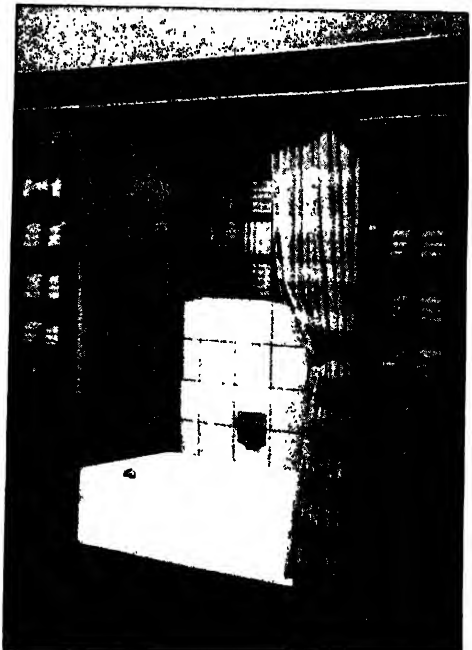
The corners can now be leveled off with a mixture of litharge and glycerine, purchased from a plumbing shop. The mixture should also be forced along all the lower edges of the tileboard after it is applied to its framing, so that it fits snugly against the tub's rim. This mixture is waterproof and dries exceedingly hard and yellow, necessitating a coat of white enamel or the application of a flexible molding and adhesive, which is manufactured especially for sealing the edges of built-in bathtubs.

The tileboard, if used, can be nailed with 1¼-in. finishing nails, inserted through its scorings. Applied vertically, it will be necessary to use edgings between sheets. The same type of moldings will be needed if the sheets are nailed horizontally, which is an undesirable method where a shower is in use.

If sufficient space exists behind the rear partition of the "built-in" tub, a chest of drawers, such as is illustrated in Figure 11.36, can be built in to fit between the

bathroom wall and the tub's partition. A narrow space makes an excellent location for a soiled linen container or open shelving.

If the ceiling cannot be patched and recalcimined or painted, soft-board tiles, as described earlier in the chapter, make an effective ceiling treatment.



Courtesy Crane Co.

FIG. 11.36. Built-in closets surrounding bathtub

Floors. Unless composed of ceramic tile, the average old or new bathroom floor can be satisfactorily covered with linoleum, linoleum tile or asphalt tile, once a level surface is assured. After all loose boards are nailed tight and all protruding nail heads driven home, if the floor presents a reasonably smooth surface which is not too badly worn, sheets of hard wallboard can be butted together and cemented with linoleum paste to form a smooth subsurface for the layer of felt which is pasted on as a foundation for the selected floor covering, as shown in Figure 11.37. In the case of a badly worn, uneven floor it will be necessary to apply a surface of ¼-in. plywood, nailed with 2d nails at 6-in. intervals over the entire surface.

Linoleum. The art of laying linoleum, although not complicated, nevertheless requires considerable concentration and thoughtfulness, particularly in the case of a large surface with corners which are not true and side walls broken up with pipes, radiators, built-in fixtures and other immovable irregularities. Space does not permit a complete treatise on linoleum laying, but the following hints may

Courtesy U S. Gypsum Remodel Research House

FIG. 11.37. Resurfacing an old floor.

serve to alleviate some of the headaches of an initial job on a small floor like a bathroom.

1. Linoleum should never be unrolled when cold; it should be kept in a warm room for 48 hours during cold weather before being unrolled.

2. Every article of furniture and fixtures should be removed from the room if possible, including inward swinging doors. Often, radiators can be raised ¼ in. and be supported by a block under the flange of the inlet pipe. Quarter-round moldings at the bottoms of the baseboards can be prized up and removed with a flat-nosed pinchbar.

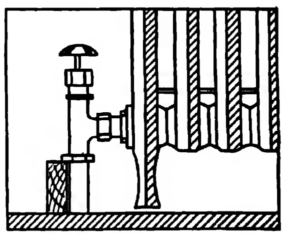


FIG. 11.38. Blocking up a radiator.

3. Except for linoleum manufactured with special backing, lining felt should be pasted on the floor at right angles to the direction of the floor boards. To prevent the linoleum seams from corresponding with those of the lining felt, the first 36-in. wide strip of the latter is split into two 18-in. strips, one of which is used as a starter against the wall of the room, with the balance of the area covered with full-sized widths. These are butt-jointed, never lapped.

4. A spreader is essential for satisfactory pasting. If not at hand, one can be improvised by filing 1/16 in. notches ⅛ in. apart on the edge of a steel trowel, or on a piece of galvanized iron which is then tacked to a bit of wood.

5. Every effort should be made to obtain the use of a roller, which is used from the center out towards the edges, to eliminate pockets. In the absence of a

roller the lining, and later the linoleum itself, must be "treaded out" as smoothly as possible, using sandbags, bricks or other weights where there is a tendency to bulge.

6. Linoleum is always cut 3 in. longer than the exact length, to allow for trimming.

7. Scribing for offsets is best accomplished with an ordinary pair of carpenter's dividers. The long side of the linoleum strip is butted against the wall as closely as possible and the dividers set for ½ in. more than the depth of the deepest offset or irregularity. Keeping the dividers at a right angle to the wall, its contour and irregularities can be scratched or scribed onto the linoleum, which can then be cut along this line with a sharp linoleum hooked knife.

8. The seams in linoleum are cut like veneer, by lapping succeeding pieces for ¾ in. over those already laid and half-pasted, then cutting through the top piece along a straightedge, down into the lower piece deep enough to score it for the final cut.

9. The final strip is flashed up the end walls for the extra 3 in. as usual, and the edge along the side wall scribed as usual, with an extra ¾ in. setting for the lap.

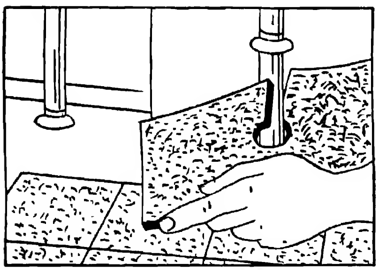


FIG. 11.39. Fitting linoleum around obstructions.

10. Obstructions such as closets, toilet bowls, or pipes can be scribed in like manner with the linoleum pushed up parallel to the wall as closely as the obstruction will permit, and a ½-in. allowance set on the dividers for irregularities in the wall. Parallel lines are drawn on either side of pipes or radiator legs for the distance they extend into the room, plus ½ in., and circles scribed and cut out to the proper diameter. As shown in Figure 11.39, a cut is made from the wall edge to permit pushing the linoleum past the pipe or leg, into the hole.

11. In small bathrooms which are too crowded for regular scribing or knifing, the method known as pattern scribing is the most practical solution. This is nothing more than the use of lining felt as templets. After cutting the strips of felt with the scissors, they are thumb tacked in place without pasting, and chalk marks made across their butted seams to insure accurate reassembly, as in gluing-up boards.

12. Paste smudges can be wiped off the surface of linoleum with a kerosine soaked rag. After 48 hours the new floor should be washed with a mild soap and thoroughly rinsed, after which a thin coat of self-polishing wax can be applied.

Tiles. Separate linoleum and asphalt tiles are laid in much the same manner as softboard tiles are applied to a ceiling, inasmuch as care must be exercised to center them accurately to allow for any irregularities in the area. As indicated

in Figure 11.40, points *A*, *B*, *C* and *D* must be located in the exact centers of each of the four walls, regardless of bays or indentations.

After snapping chalk lines that cross the center of the room, a row of uncemented tile is laid with its edges along one line, crossed by a row at right angles tangent to the other line, as in A of Figure 11.41. The rows can then be shifted, a tile at a time, until the border spaces at the ends of each row are equal. Borders should not be less than half a tile wide. With an even number of tiles, the two tiles in the center of each row, (*A*, *B* and *C*), should meet exactly. In the case of an odd number, the edges of the middle tile should fall at equal distances from the second center tile, as in B of Figure 11.41.

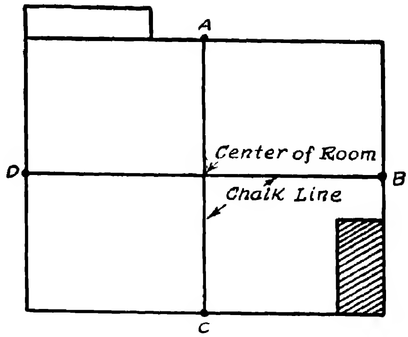


Fig. 11.40. Locating centers of walls and room.

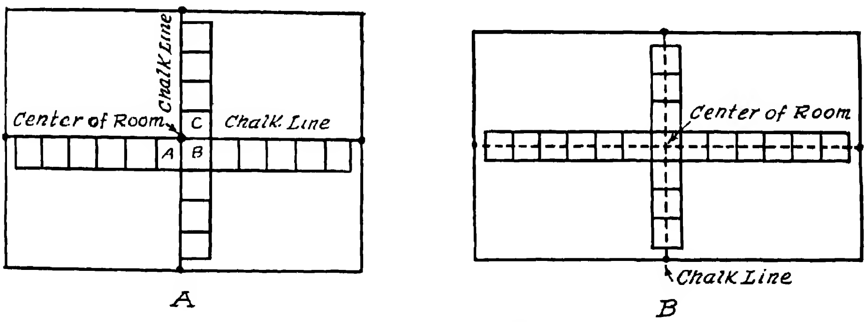


Fig. 11.41. Locating tiles.

The two cross rows can now be cemented in place by setting each tile in position on its paste (if tiles are slid into place, cement will be forced up between the joints). Dried cement on asphalt tiles should be removed with No. 00 steel wool, never with gasoline, kerosine, benzine, naphtha, turpentine, or alcohol, which will damage the tile.

In order to prevent chipping, asphalt tiles should be warmed sufficiently to make them pliable before cutting. An infra-red lamp, electric or gas heater, an open oven, or even hot water can be used. With hot water, however, each tile must be carefully dried before laying; in any event, care must be exercised to avoid excess heat, which will cause the surface of the tile to blister. Once warm, they can be cut with a linoleum knife or a pair of tin snips.

Asphalt tiles set in various patterns of alternating light and dark colors, or

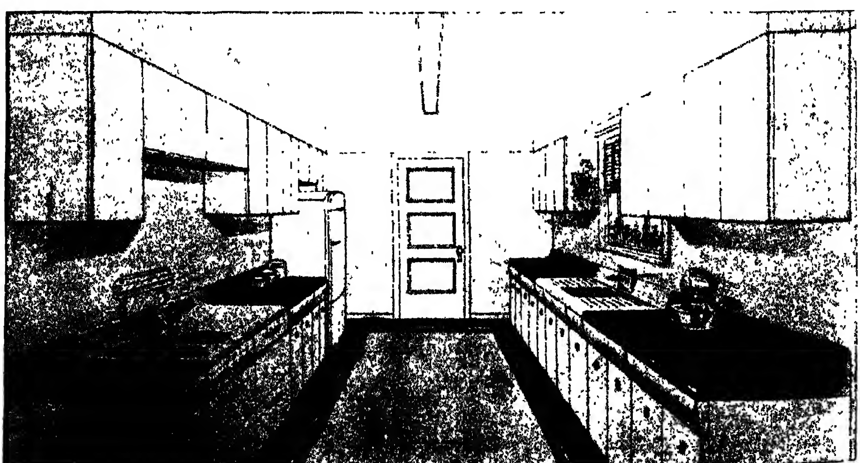
black, with a solid border, create attractive and durable floors, provided the subfloor is smoothly surfaced so that the corners of all tiles will lie flat. A newly laid floor of asphalt tile should not be washed before two weeks, and then only with very mild soap. Only self-polishing (water) wax should be used; paste wax will cause the colors to run.

BRINGING THE KITCHEN UP TO DATE

The forgotten room when redecoration is under discussion is likely to be the most important room in the house—the kitchen. Frequently laid out so that thousands of useless steps are expended during the preparation of the family's daily meals, it is often the room most taken for granted when remodeling plans are being drafted.

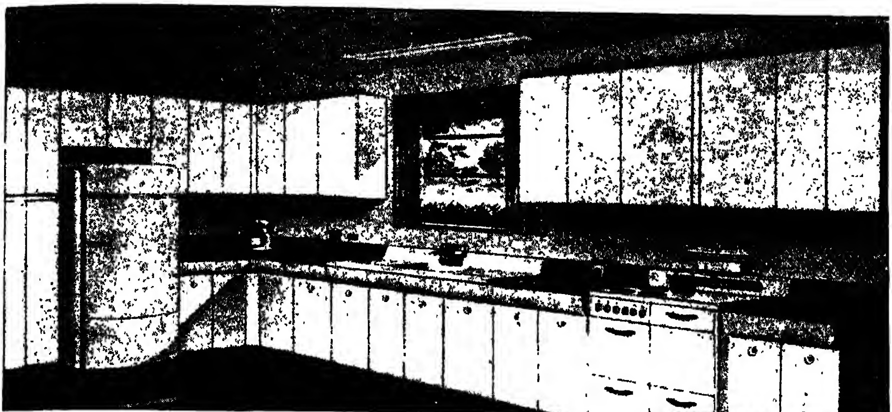
Modern kitchen design, while catering to appearance, is fundamentally concerned with efficient arrangement, borrowing from the production line of industry the basic concept of the uninterrupted flow of raw materials through the manufacturing or cooking processes to the finished product. The ideal kitchen, therefore, should have its refrigeration unit or storage area near the reception point for raw materials at one end of the "line," with the stove at the other end, convenient to the dining area for the serving of the "end product." The sink should be midway between.

Many existing considerations, such as the present location of plumbing, chimney, gas or electrical service outlets, doors, windows and dining area, may seem to limit the possibility of rearrangement of the basic kitchen fixtures. Often, however, a careful analysis, followed by a realistic approach to the problem, will result



Courtesy American Kitchens Styled in Steel

FIG. 11.42a. Corridor-type kitchen.

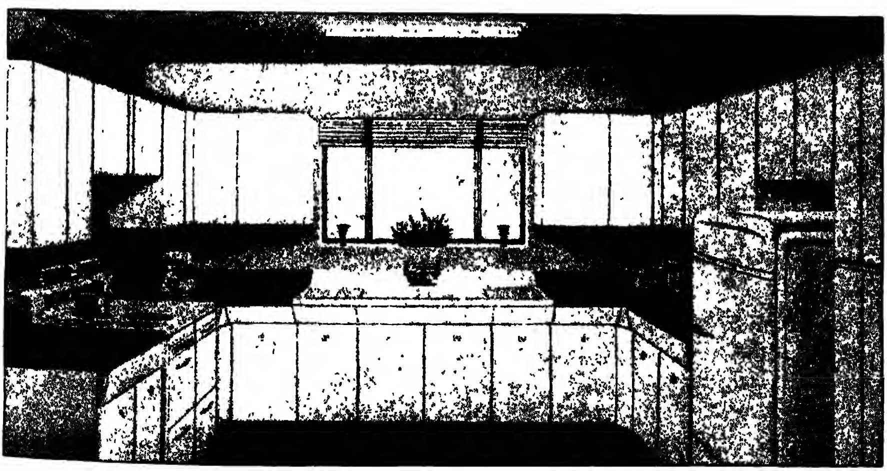


Courtesy American Kitchens Styled in Steel

FIG. 11.42*b*. L-shaped kitchen.

in at least a partial modification of an unsatisfactory layout, if not a complete relocation. Flexible copper tubing renders changes in plumbing installations less difficult than formerly, and gas or electrical outlets for stoves or refrigerators are not prohibitively difficult of relocation.

Using the modern equipment available, research workers have exhaustively investigated the relative efficiency of kitchen layouts. Cooking an identical meal in each of the three standard arrangements, it was found that the maximum number of steps, 454 in all, was required during the preparation of the meal in the popular "strip" or corridor type of kitchen shown in Figure 11.42*a*, whereas



Courtesy American Kitchens Styled in Steel

FIG. 11.42*c*. U-shaped kitchen.

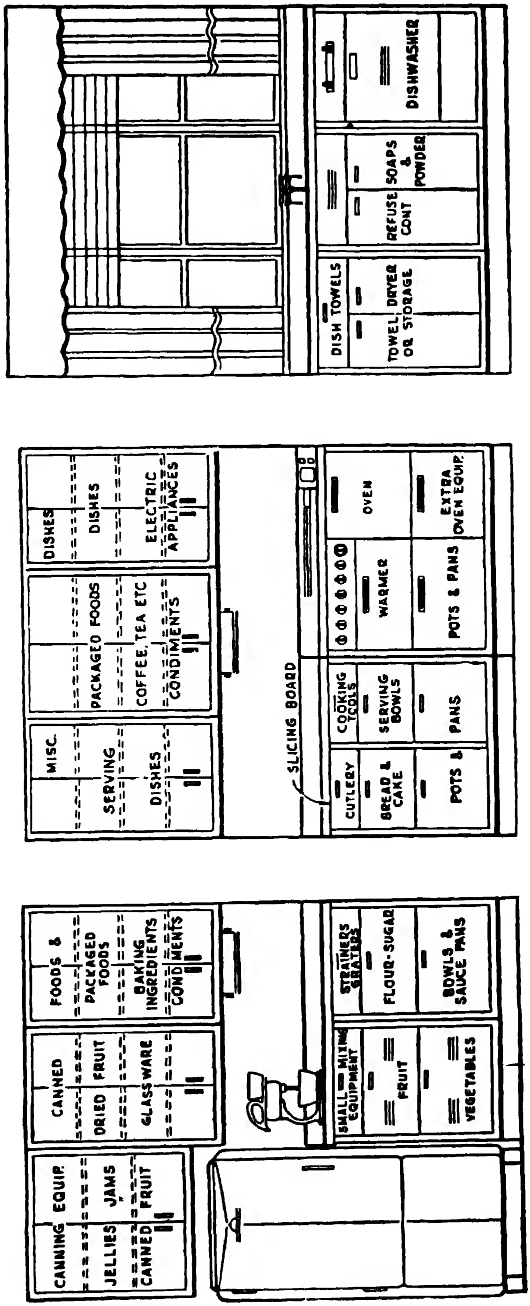


FIG. 11.43. Three major work centers form the basis of every modern kitchen plan.

286 steps were clocked in the L-shaped kitchen (Figure 11.42*b*), and only 282 steps in the efficiently U-shaped layout (Figure 11.42*c*).

The Work Centers. As stated, present-day kitchen planning is based upon the interdependent location of the important work areas or centers; the mixing center with its refrigeration unit for the receipt and storage of food; the cooking center, with attached serving counter; and the washing-up or sink center, with drying and serving counters. The utensils for these centers should in turn be stored over and under the operational areas. Thus the work centers and their tools, as suggested in Figure 11.43, located in relation to the outside kitchen door and the dining area, dovetail into a homogeneous unit for the saving of needless labor. Modification of the dining alcove into the popular modern snack bar is an additional time and step saver.

Dual Purpose Dining Areas. If a dining room exists in the house and space is at a premium, with a little foresight it can be made available for use between meals. A suitable cover makes the dining table ideal for the family's homework or as a general work table or office during the day. In the case of a dining alcove opening off the living room, French doors will insure privacy. Replacing the partition into the kitchen with ceiling-high cabinets, back to back, will provide not only for the storage of dining room accessories, but other items such as a typewriter, stationery, or books. These cabinets can be built in either as double units, affording storage space for both rooms, separated by a single backing, or as a

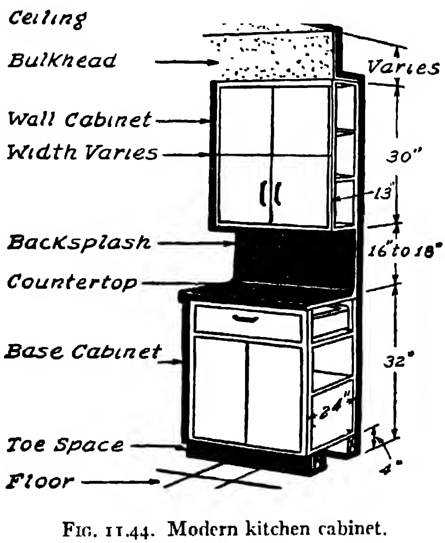


Fig. 11.44. Modern kitchen cabinet.

single deep cabinet with openings on either or both sides, as in Figure 11.44. The wall space above the lower, base cabinet and under the upper, or wall type cabinet, can be fitted with a sliding or hinged door, to act as a serving panel into

the kitchen. The construction of this type of cabinet was explained in Chapter 2.

Reaching from floor to ceiling, the dining room side of the cabinet is finished to match the existing color scheme and trim. If space permits, the cabinet can be constructed wide enough so that when the serving panel is open, the dresser top in the dining room can accommodate two or three bar stools, to serve as the top of a snack bar. Built to ceiling height, a pair of these cabinets, with a double-hinged door between, will form a new partition, where it is desired to lengthen either dining room or kitchen.

Kitchen Cabinets. For the modern kitchen, with its continuous counters over base cabinets, and with a series of wall cupboards some 18 in. above the counter, it is only necessary to modify the kitchen cabinet described in a preceding chapter of this book. For reasons of economy, the back should be eliminated and the "cabinet" redesigned into two separate units. The width of these units differ individually with the space they are to occupy, but their depth and height can remain unchanged. The wall cabinets should be located at least 16 in. above the counter to accommodate devices such as electric mixers. Figure 11.44 shows the average dimensions and spacings of available modern cabinets, with a reduction in the prevailing 36-in. height of the counter or base cabinet's top, to the 32-in. working height preferred by the average woman studied by Oregon State College researchers. Figure 11.45 shows a variation to provide for end or corner units.

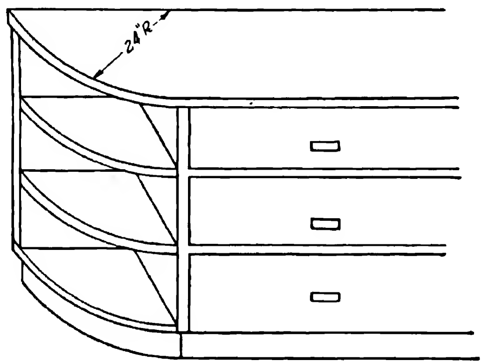


FIG. 11.45. Provision for end or corner units.

It will be noted that in all cases the wall cabinets are extended to the ceiling. This additional space may be provided with doors for the storage of seldom used articles, although the average housewife prefers a solid bulkhead eliminating the storage space that cannot be used without resort to a stepladder, often a forgotten hiding place because of its inaccessibility.

Wall cabinets above the refrigerator, sink, and range are necessarily of less height to permit adequate work space. Narrow portions of wall space are excellent locations for full length closets housing cleaning materials, brooms, or vacuum

cleaners. Where the laundry is located in the basement below the kitchen, the door under a narrow base cabinet can serve as the opening to a laundry chute.

The accessories shown in Figure 11.46 are convenient secondary aids to the basic installation of adequate working centers. The ingenious home mechanic, on the advice of the housewife, can install variations within his kitchen cabinets

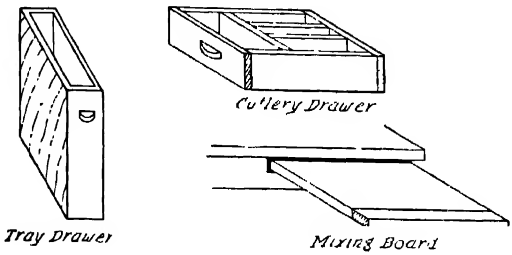


FIG. 11.46 Accessory aids

which will adequately house such varied items as tall bottles, thin trays, flat cutlery and small condiment containers. It is well to beware of consigning pots and pans to one or two deep shelves behind doors. This results in double tiering of one vessel on the other, with consequent inaccessibility. Sliding shallow shelves or partitioned drawer racks on the back of a cupboard door for the pot lids are preferable.

Remodeling Old Sinks. An old style kitchen sink, if in good condition, can be modernized as shown in Figure 11.47. For the average round-cornered types it will be necessary to determine the radius of the sink's corners. If a long piece of cardboard is available, this can be traced and cut out as a templet; otherwise it can be determined by applying a try square to a corner of the sink, and measuring from the corner of the square to the point where the curve breaks into the straight line of the sink's side or front. Since both of these points are equidistant in the case of a true curve, they are the radii of the curve for the top and bottom framing of the cabinet.

To fit under the rim of the average sink and extend far enough below to support the top of a plywood siding, 2 in. × 2 in. stock will probably be required. The two side members and the front can be cut to extend as far as the curves at the sink's corners and held in place while a piece of board and a level are used to mark consecutive points on the floor, plumb with the outer edges of the top framing members. These points are joined up to make a rectangle. At the corners, the radii already measured are laid off with the try square, which is then inverted, and its corner used to swing an arc for the curve. A paper templet can be used to transfer this arc to a piece of 2 in. × 4 in. or 2 in. × 6 in. stock, which is sawed into a 2 in. × 2 in. corner piece, cut and doweled to the front and side top members as shown.

The base of the cabinet can be constructed from rough 1 in. × 2 in. stock with the corners cut out from wider material or laid out with a series of small blocks. It is securely nailed to the floor, leaving space for a pair of doors in front, their width depending on the size of the sink. The uprights for these doors and the corners and rear of the sink are cut to fit under the top of the frame, with a notch or a rabbet behind the base. The corner posts should be planed round to fit into the outside arc of the curve, and the rear uprights cut out to

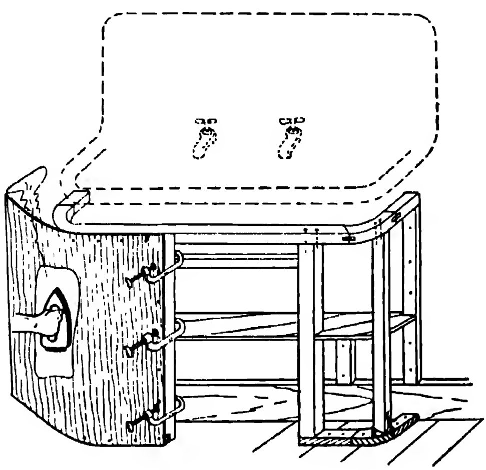


FIG. 11 47. Remodeling an old sink.

receive the baseboard, unless the latter has been torn off to accommodate a continuous array of kitchen cabinets flush against the wall. These uprights, after being plumbed and marked, can be fastened with nails through the upper framing, after which the whole unit is wedged into place and nailed to the base frame. It is most essential that the uprights on either side of the front door opening are exactly plumb to insure that the doors hang properly.

If a shelf is desired, cut a paper templet of the inside of the base plus the thickness of the baseboard, and apply it to a piece of ½-in. plywood or other material. This shelf should clear the trap in the plumbing. Its rear edge rests upon a strip nailed horizontally to the rear wall, supported, if necessary, by vertical strips nailed to the studding above the baseboard. The front edge rests on small angle irons secured to the front and corner uprights.

Four-inch toe space is provided for by a 1 in. × 4 in. strip leveled and nailed or angle-ironed into place through the side members. A 2 in. × 2 in. header is likewise fastened 4 in. down from the edge of the sink's rim, to serve as both a door stop and support for the bottom edge of the piece of facing plywood.

The exact lengths of the ½-in. plywood side panels can be obtained by using

a dressmaker's tape measure or piece of cord around the outside edge of the top frame. Deduct for the baseboard, using a templet formed from a piece of wire solder pushed snugly around the profile of the baseboard. The plywood must be cut with the grain running vertically to the floor, or it cannot be bent into place.

Before bending the plywood, attach it with screws along an upright on one side of the door. To prevent its pulling loose from the screws, at least three C clamps should be used over a scrap of lumber to prevent marring. The outside of the plywood at the curve is wetted down, and a hot iron applied over a cloth

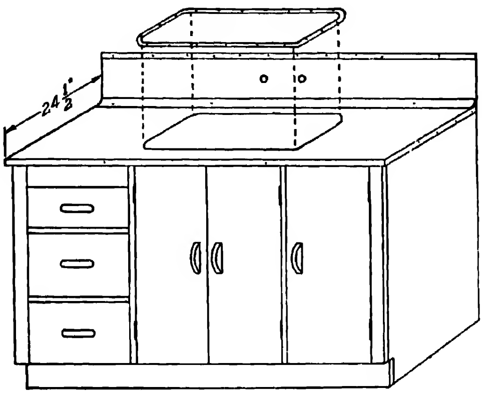


FIG 11.48. Metal sink rim.

to steam the panel. The bending must be accomplished slowly in order to avoid cracking the plywood, which is nailed or screwed to the framing as it is bent. To insure that it dries slowly, without cracks, the plywood should be kept damp for 5 or 6 hours, well braced with uprights wedged by diagonal braces to convenient corners or blocks in the floor.

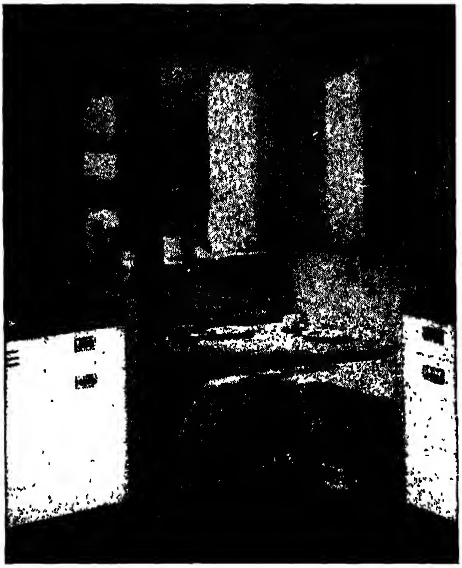
The doors can be cut from plywood or heavier stock and attached with nickel-plated butt hinges. Friction catches will hold both doors in place at their tops and the knobs or handles should match the remainder of the kitchen hardware.

White enamel over two undercoats will finish the cabinet. After it is dry, a 4-in. band of black enamel around the bottom not only will add to the cabinet's appearance but will conceal splashings from floor mopping.

It is preferable to replace the old sink entirely with a flat-rim type, whose cabinet can be constructed to match the base cabinets of the other units. These sinks are available commercially for installation in this type of cabinet, flanked on either or both sides of counters of matching linoleum. As shown in Figure 11.48, metal sink rims are provided as seals which can be screwed down over the linoleum around the sink's edge. Several types of stainless steel or chromium plated moldings can be used to bind the counter's edge, as well as the corner and

edge of the splash backing. Certain types of molding, unless rabbeted into the counter edge, require a layer of building felt under the linoleum. This will raise the sink's counter above the counters or tops of adjoining base cabinets, unless allowance is made during construction.

Dinette. Where space does not permit the installation of a permanent dinette or snack bar in the kitchen, as illustrated in Figure 11.49, folding tables and



Courtesy Crane Co.

FIG. 11.49. Built-in dinette with swinging table

benches can be constructed, hinged flat to the wall when not in use, as explained in Chapter 4. Continuous counter space under a wall cabinet can be interrupted at an end section or in a corner by the installation of a simple fold-up table as shown in Figure 11.50*a* and *b*. Electrical appliances, such as toasters, percolators, or waffle irons, can be stored within the space behind the table top, together with the necessary dishes for simple meals.

The table top is hinged to the center of the counter top, flush with the upper portion of the wall cabinet. It is supported, when lowered, by a cleat hinged to the front edge of the shallow drawer in the base cabinet when open. The two doors below provide space for folding chairs. Figure 11.51 illustrates the use of sliding shelves for a twosome meal.

Planning Center. A little foresight in the partitioning of the space behind the hinged table top will provide compartments for recipes, grocery accounts and other kitchen management data, creating a convenient "office" or planning center.

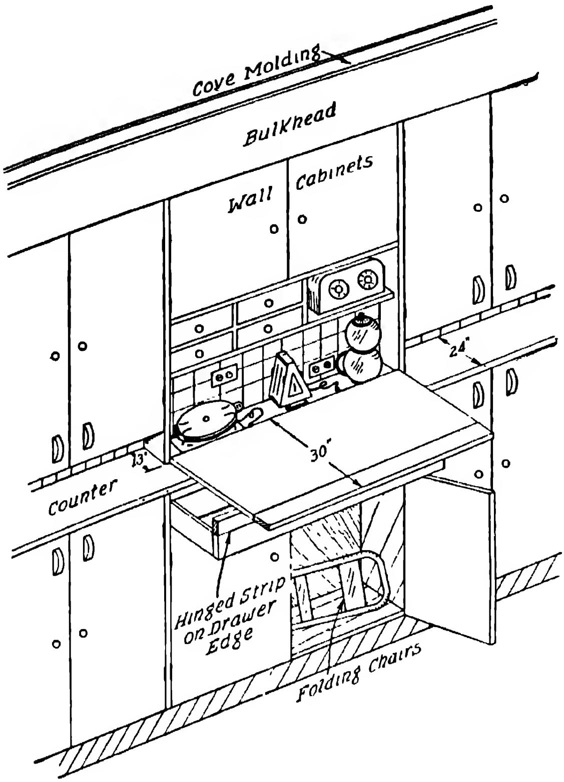


FIG. 11.50*a*. Dinette or office table.

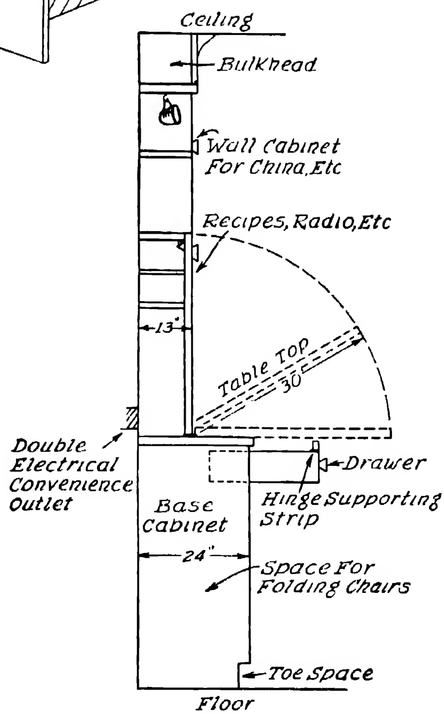
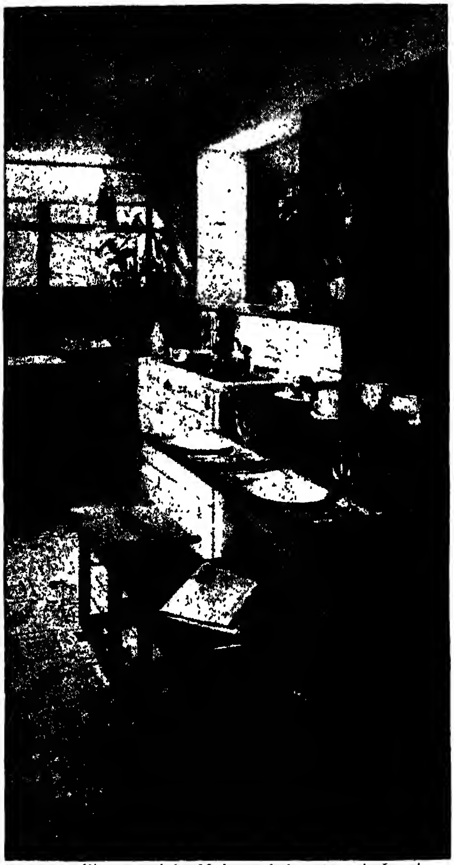


FIG. 11.50*b*. Cross section—dinette or office table.

If a plug-in telephone is in use on the ground floor, an outlet at this additional work center will save many steps during the day. A small radio, or a plug for a portable radio if desired, could be suitably located here.



Photograph by Makers of Armstrong's Linoleum

FIG. 11.51. Breakfast à deux on sliding shelves.

Ventilating Fan. When the cooking range is located against an outside wall, the installation of a ventilating fan above it is a very worth-while project. A 10-in. electric fan mounted in a simple frame requiring a 12 in. × 12 in. opening, as in B of Figure 11.52, will effectively remove kitchen odors. The outside casing, complete with slanting sill and drip cap, can be inserted between studs bridged by 2 in. × 4 in. headers. Care should be exercised that the outside casing is weatherproof. (See Installing an Extra Window, p. 500.) On an inside partition, the fan duct may be carried to an outside wall through a hollow bulkhead.

The outside metal frame, shown in A, complete with shutters, can be procured ready to install or can be cut from 1/32-in. sheet metal as illustrated. The sizes shown in the diagram are based on a 10-in. fan and a frame house having a 9-in. outer wall. An indoor shutter is provided as additional protection during inclement weather; it is mounted to open sideways.

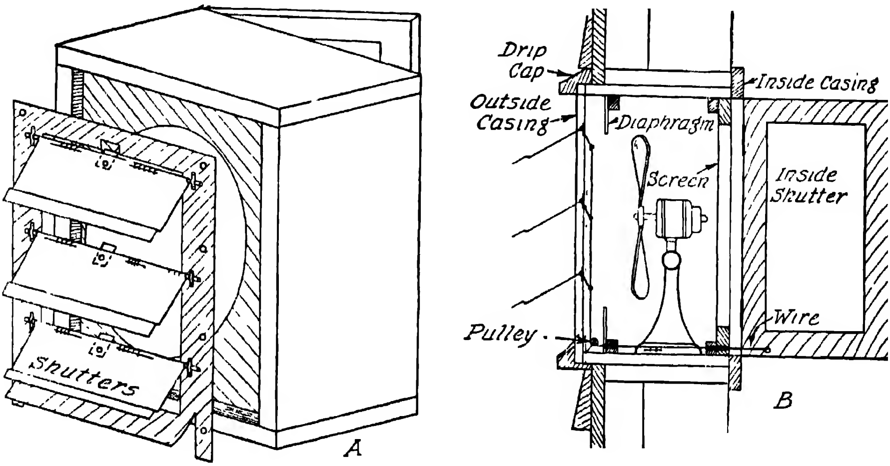


FIG. 11 52. Ventilating fan.

The three metal shutter leaves are rolled over nonrusting brass rods, of 1/8 to 1/4-in. diameter, which are pivoted to the metal shutter frame with riveted brackets as illustrated. The lower edges of the two upper leaves are offset to provide a flush fit over the rods when the leaves are down. Small angle irons riveted to the center of the top inside edges of each leaf are threaded with picture wire which is knotted at each angle iron, linking the leaves together. This wire passes through a small pulley in the sill and is adjusted in length so that when it is fastened to another angle iron on the hinge edge of the inside shutter, the metal leaves will raise as the inside shutter opens. If the inner shutter is to open to the side, a pivoted pulley will be required through which the linking wire is threaded to a reversed angle iron at the base of the inside shutters hinged edge. If the weight or adjustment of the metal leaves will not permit them to close properly, it will be necessary to adjust a screen-door spring horizontally to the angle iron of the top leaf so that its tension will pull all leaves down as the inner shutter closes.

The outside casing has a 1/4-in. rabbet to receive the metal shutter frame, which is cut 1/4 in. larger than the opening, with an added 3/8 in. at the bottom to provide for an outward roll or cove which will shed rain. This will require adequate planing of the inside face of the outer framing. The top of the metal frame must

be notched, as shown, to provide clearance for the top shutter's angle iron. A metal diaphragm with an 11-in. hole is mounted in saw kerfs in the frame so that it clears the angle irons of the shutter leaves. The fan is mounted directly in rear of the diaphragm and is controlled by a convenient wall switch.

If the thickness of the inside frame permits, a removable screen should be constructed for insertion against cleats behind the inner shutter, to keep out insects when the shutter is open and the fan turned off, as well as partially to mask the fan.

Walls. Already scored and painted tileboard makes a sanitary and colorful wall covering, which can be applied directly to the walls with adhesive or nailed through the scored markings as explained in the section on Modernizing the Bathroom, p. 520. Colors should be selected that will reduce the glare and be restful to the eyes, while harmonizing with the cabinets, ceiling and floor.

Floor. Three considerations govern the choice of floor covering. The first is the fact that the kitchen worker is on her feet practically all the time; therefore, a resilient type of floor covering is highly desirable in order to reduce fatigue. Second, the nature of kitchen work requires a floor covering which is not only

FIG. 11.53. Kitchen finished in knotty pine.

durable, but non-absorbent and stain resistant. Third, the design or color and the shape of the moldings should be such that they are easy to clean and maintain. In applying a floor covering that requires an adhesive, it is essential that the underfloor be level. This can best be achieved in some cases by covering the floor with plywood.

Lights. The central ceiling fixture customarily installed in the kitchen should be augmented by auxiliary lighting directly above each work center. A most satisfactory method is to install fluorescent fixtures to the bottom of the wall cabinets directly above the sink, stove and mixing counter. These can be locally controlled by pull chains or switches built into the fixtures, with enough convenient outlets provided to take care of presently owned electrical appliances with an allowance for additions. Modern electrical appliances, however, are being built to consume more and more current and, if used simultaneously, will require an additional branch circuit, as explained in the following section, Finishing the Attic in Wallboard.

Trends. Whether it is merely a current enthusiam or the result of cramped living conditions and lack of servants, there is a definite trend toward bringing the kitchen into the living room, or vice versa. This is more prevalent and practical in the informal atmosphere of country homes and week-end cottages, where all hands frequently "turn to" in helping prepare the simple meals. The plea that the housewife becomes necessarily ostracized, or at least incommunicado during the preparation of meals, is the reason advanced for making the kitchen a comfortable lounging place for herself and guests, before, during and after the concoction of regular meals or irregular snacks.

As pictured in Figure 11.53, knotty pine lends itself well to this type of background, especially when its use is extended to the construction of the cabinets. The beamed ceiling and brick or tiled floor complete the homelike feeling.

FINISHING AN ATTIC WITH WALLBOARD

The variety of wallboards available to the home mechanic makes reclamation of waste space in the attic a far from difficult project. Predecorated sheets and planks of softboard are manufactured in various shades and groovings, which not only produce pleasing effects, but by providing additional insulation, will add a valuable weatherproofing factor to the empty upper story of the house. If preferred, fire retarding sheets of plasterboard can be installed with concealed joints suitable for wallpapering. Other surfaces feature remarkably natural facsimiles of wood graining, including knotty pine or glossy tiles in a wide range of colors and trim. Once a simple framing is installed, these wallboards are easily attached by various methods which will be explained later. Some of the general properties of various wallboards appear in the table below.

CHARACTERISTICS OF VARIOUS WALLBOARDS

Type	*Surface*	*Color*	*Thickness (inches)*	*Texture*	*Fire Retardant*	*Heat Insulation*	*Material*
Softboard	Rough, one side smooth	Tan and Cream	½–1	Porous	Fair	Excellent	Cane or wood fiber
Semi-Hardboard	Semi-smooth	Tan and Cream	⅛–3/16	Porous	Fair	Good	Cane or wood fiber
Hardboard	Smooth	Brown (and colors)	⅛–⅜	Dense	Good	Fair	Wood fiber
Plaster (gypsum) board	Smooth	White	¼–½	Semi-dense	Excellent	Good	Gypsum between cardboard
Asbestos	Smooth	Gray (and colors)	⅛–3/16	Dense	Excellent	Fair	Asbestos fiber
Plywood	Smooth	Wood	¼–¾	Semi-porous	Poor	Fair	Douglas type fir
Pressed Wood	Smooth	Brown (and colors)	⅛–¼	Semi-porous	Poor	Fair	Wood or vegetable fiber

Available space. Each attic presents a different problem, depending primarily upon the pitch of the roof in relation to the size of the house. In general, if the rise (*R* in Figure 11.54) is less than 8 ft., there will be insufficient headroom for a usable room. Since the minimum standing headroom is considered to be 6 ft. 6 in., and the average person requires but 4 ft. of headroom when seated, preliminary measurements indicating the points at which 4-ft. walls will intersect the sloping rafters will determine the width of the prospective room, as shown in the diagram based on a house 24 ft. wide. The length of the room will be dependent upon the length of the house, the placement of the stairs, and the location of any interior chimneys. Unless the house is unusually large, a rise less than ⅓ of the span (*S*) leaves attic space which will offer an impractical minimum of headroom.

This is not to imply that all floor space in an attic room will require standing

or even sitting headroom. The sloping walls near the eaves can well accommodate baggage storage space, closets, or built-in bunks, desks, chests of drawers and bookcases. In addition, dormer windows provide valuable headroom, with space for window seats, vanity tables, sewing machines, easels, or other paraphernalia.

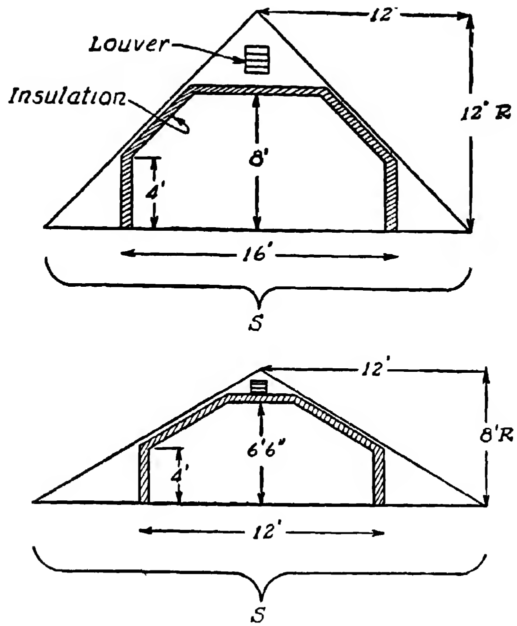


FIG. 11.54. Pitch of roof.

Layout. When the attic is small or only one room is to be finished off, the problem is relatively simple. It generally hinges upon how much storage space is to remain unfinished in relation to the stairway's location. Where space exists for an apartment of two or more rooms, preliminary measurements of the available area should be reduced to a rough floor plan, to visualize just how the location of the stairway will exercise an important influence on the arrangement of the rooms. In large houses the attic stairs are often centrally located, providing an ideal situation for a layout with rooms opening from a small central hall. Where the stairway enters the attic at one end, however, there is seldom sufficient headroom available for a lateral hallway, and the floor plan must permit entry into a living or general purpose room first, with the bedroom at the rear.

Bathroom. The bathroom will be more economical if located above the bathroom on the floor below. The use of copper tubing for water pipes greatly facilitates such an installation, but drainpipes require deep notching of the floor joists.

Newer houses, with "expansion attics," often have plumbing roughed in, ready for the installation of fixtures at a later date.

It is generally conceded that the minimum bathroom employing the three standard fixtures must measure at least 5 × 5 ft.; if a shower is substituted for the tub, the over-all size can be reduced to 3 × 6 ft. The preferred size of 6 ft. ×

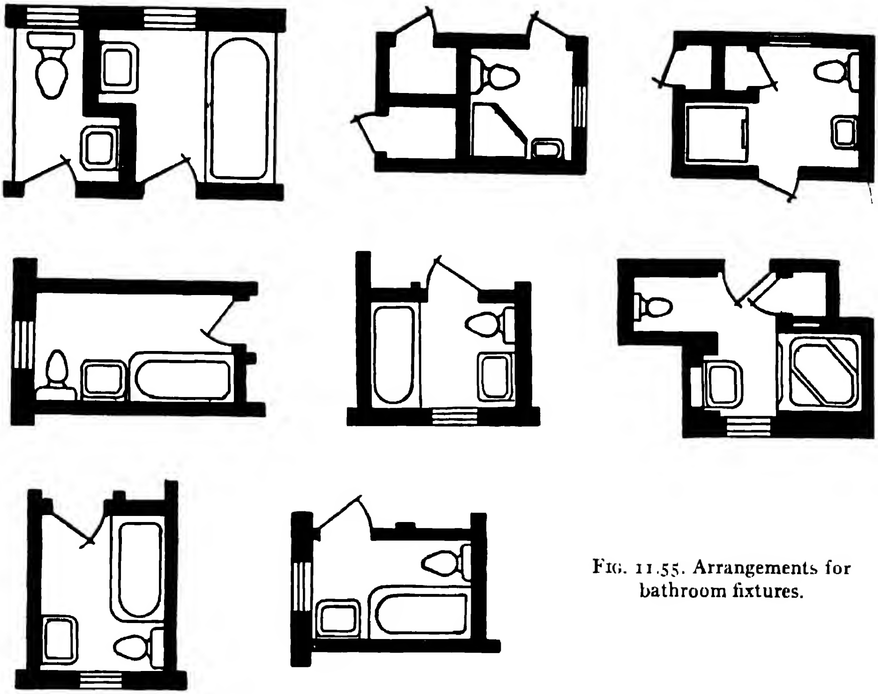


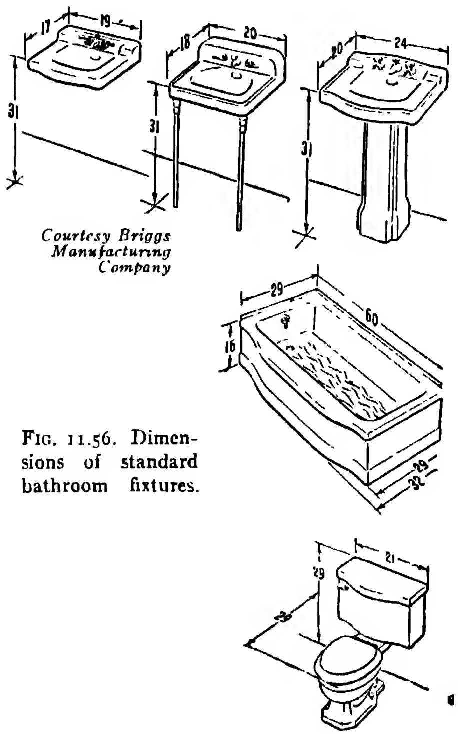
FIG. 11.55. Arrangements for bathroom fixtures.

8 ft. will permit the occupancy of two persons at a time, such as an invalid with attendant, or children with a parent. Various groupings are shown in Figure 11.55. Dimensions of standard fixtures are indicated in Figure 11.56.

Privacy and the maximum use of three fixtures can be obtained by a separate partition and door for the water closet, or water closet and lavatory. Where all three fixtures are located in one room, the lavatory, as the most graceful, should be the first visible fixture when the door is opened, and the water closet the least visible.

In general, bathroom fixtures should be so arranged that they will be installed on inside walls as protection against frozen pipes. If this cannot be satisfactorily arranged, a false partition can be erected around the pipes on the outside wall, and packed with mineral wool. Radiators are always placed on the outside wall, and, for obvious reasons, the tub is never located under a window.

Partitions. Having determined the perpendicular height of the side wall at various points along the floor, connect these marks with a line drawn along a straightedge or snapped with a chalk line. The 2 in $\times$ 4 in. plate is placed to the rear of, and along, this line, and the first vertical stud measured and cut. If the floor is level, this stud can be used as a templet for all remaining studs, whose lower ends are then marked on the plate, after checking each with a level.



Courtesy Briggs Manufacturing Company

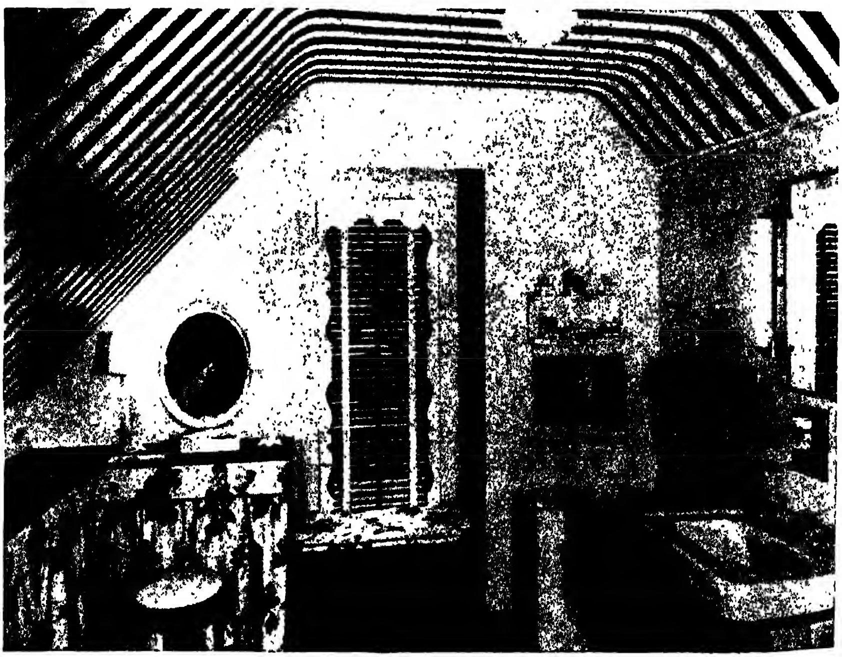
Fig. 11.56. Dimensions of standard bathroom fixtures.

During the construction of partitions, every effort should be exerted to avoid vibrations in the floor joists which might loosen or crack the ceiling below. It is therefore preferable to nail in advance all studding to the floor plate from the underside. The completed frame is then righted, and the plate secured to the joists, through the flooring, by means of long lag screws. This will necessitate careful measurements, both for the vertical side wall studding, and the holes for the lag screws centered on floor joists. If the floor joists are heavy, the plate can be toe-nailed in place.

Although the average 4-ft. sheets of wallboarding can be satisfactorily applied to studs erected on 24-in. centers, most roof rafters are spaced on 16-in. centers, which is also the usual width of batts or rolls of insulating material. It is advisable

therefore to space the short studs in the 4-ft. side walls on 16-in. centers, toe-nailing them under the roof rafters as shown in Figure 11.58. If wallboard planks of random widths are to be applied, a simple method is to spike the short studs to the side of every other rafter, deep enough for horizontal furring strips at 2-ft. intervals, as in detail A. These short side wall studs can be of 2 in. × 2 in., 2 in. × 3 in. or 2 in. × 4 in. material. If it is intended to insulate the new room or rooms, louvers should be installed at the highest point under the ridge or peak at each end, before the collar beams are attached. Louvers should average 1 sq. in. per 250 sq. ft. of the area to be ventilated, and can be easily constructed from 1 in. × 4 in. stock, forming a small window frame, complete with outside casing, drip cap and sill. The leaves, 5¾ in. wide, are dadoed into the sides of the frame at 45°, as is the sill. If preferred, a triangular or semicircular outer casing can be so constructed as to conceal the outlines of box-like frame behind it. Where a chimney intervenes, these casings can be bisected and two small louvers installed on either side of the chimney. Louvers are inserted like windows, with headers across any studs through which it may be necessary to cut.

The next perpendicular measurements will establish the limits of standing headroom. This is marked on the rafters on both sides of the room to determine



Courtesy U.S. Gypsum Remodel Research House

FIG. 11.57. Attic bathroom.

the location of the horizontal (parallel), collar beams, which support the ceiling proper. At the gable ends, blocking is inserted between the original studs at floor level, in lieu of a plate, to support the baseboard. With thin wallboards, the use of an additional nailing strip for the top of the baseboard is good practice.

Interior partitions can be erected with studs on 24-in. centers; 2 × 4's are preferable, with double studding around doors and windows. Interior corners, where a partition is butted up against a side wall, require an additional stud or studs as a nailing surface for the edge of corner sheets of wallboard, as indicated in Figure 11.58. Studs which must be placed between rafters are fastened to

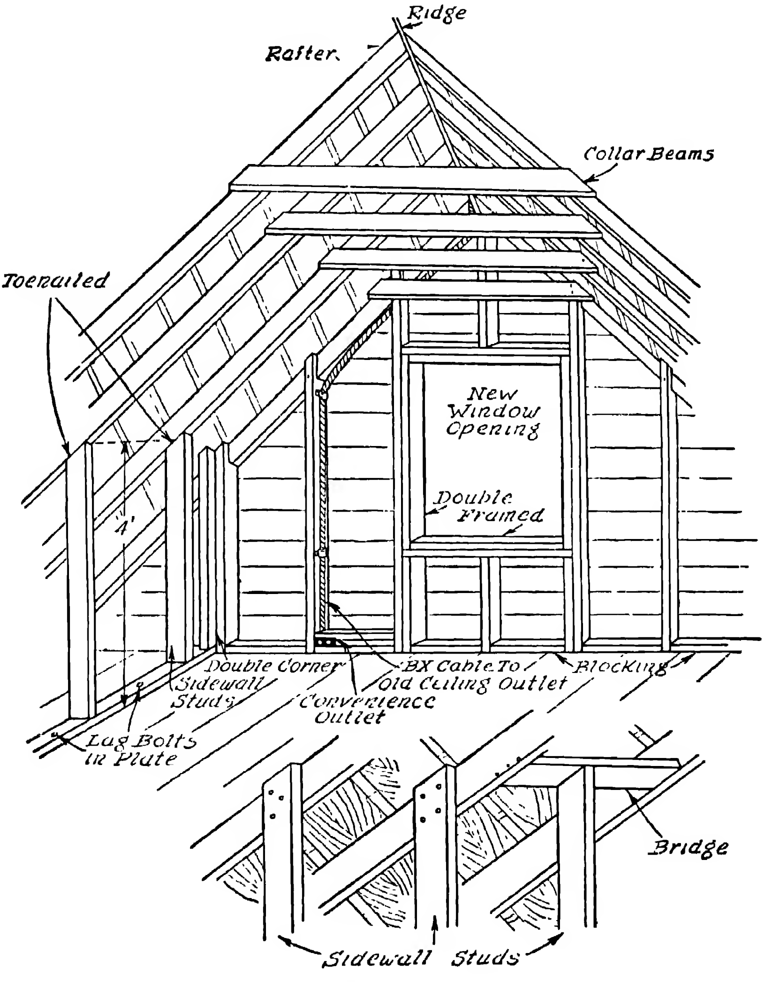


FIG. 11.58.

2 × 4 bridges. Full-length partition framing should include bridges between studs at chair rail height to insure rigidity. Extra bridges or blocking are added to either side of door framing to prevent vibration when doors are slammed. If windows exist at the gable ends of the attic, they will probably need to be enlarged to insure adequate light and air. The method for installing a window has been explained in a previous section of this chapter. With an unfinished rear wall to work from, the process is much simpler and double framing can be run up with little effort as shown in Figure 11.59*a*. If room permits, a minimum height of 20 in. from window sill to floor should be maintained. This will permit the installation of a window seat, if desired. Other treatments of gable windows depend upon the purpose of the room. Built-in bookshelves on either side will not only afford siding for a window seat, but will form an attractive alcove for a built-in, knee-hole desk. A similar effect can be achieved by building closets on either side of the window to frame a vanity table, facing the light.

Fig. 11.59*a*. Framing a window opening.

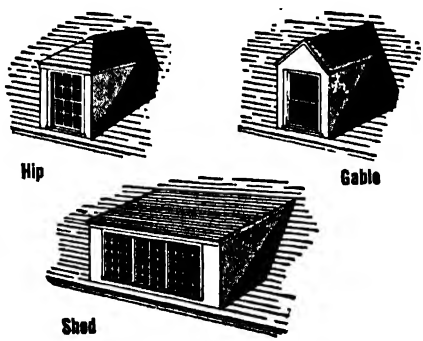


Fig. 11.59*b*. Conventional types of dormer windows.

Dormer windows not only increase available headroom, but may be necessary to provide the required ventilation and light. Symmetrically located, they will improve the exterior of the house. Three conventional types are sketched in Figure 11.59*b*. For widths over 8 ft. the shed type must be used. Unless the house is so located that one side of the sloping roof faces to the rear, it will usually be necessary to balance one dormer with another. Shed dormers, because of their extreme width, offer a maximum of headroom.

This type of dormer window is relatively simple to frame and should be located high enough on the roof so that the dormer's ceiling is on a continuing level with the ceiling of the room. The size and number of the windows will determine the over-all width of the dormer. A table of common sash size appears on p. 496 of

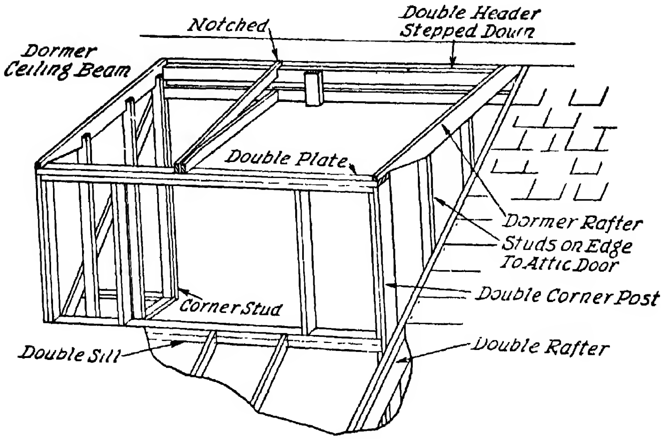


FIG. 11.60. Framing a shed-type dormer window.

this chapter. Lumber, 2 in. $\times$ 4 in., is suitable for dormer framing, doubled at corner posts, plates, sills and headers.

Having decided upon the minimum width of the dormer, it is measured off between the rafters, expanding if necessary so that the 2 $\times$ 4 studs when set on edge can be fastened to the roof's rafters on either side, as in Figure 11.60. The studs are easier to nail against the rafters when set sideways, but do not provide as much space for insulating material.

Next the position of the outer corner posts is located, providing sufficient space for a double plate at the top to support the dormer rafter ends, as well as the top of the window frames. By measuring upward from these marks it can be

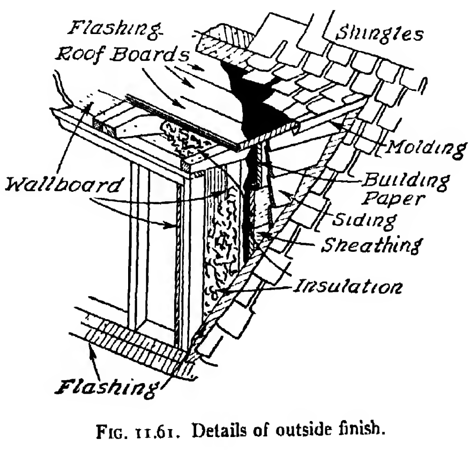


FIG. 11.61. Details of outside finish.

determined where to cut across the attic rafters, allowing sufficient space for a double header across the cut ends and a proper pitch to the dormer rafters. Holes drilled at the four corners of the dormer opening, inside the attic rafters, will mark the space on the roof from which shingles or other roof covering must be removed before sawing through the roof boards. These are then removed to permit cutting across the exposed rafters. Details of the framing are explained in Figure 11.60.

Before the siding is applied to the finished dormer, great care should be exercised in laying the flashings. These can be either of copper, tin, or asphalt

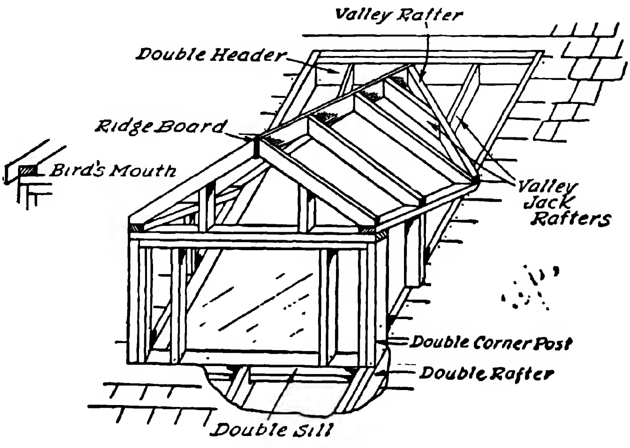


FIG. 11.62. Gable dormer framing.

roofing, and are slid well under the shingles or other roof covering at the sides of the dormer, then bent up and tacked to the dormer's sheathing to form a waterproof valley. The same procedure is followed at the sill, except that the flashing must be attached under the sill and over the first course of roof shingles. Needless to say, exceptional care must be exercised to insure a waterproof joint where the dormer roof joins the house roof. The sectional diagram in Figure 11.61 shows the various layers of building material required for the finished dormer.

The smaller-sized gable-roofed dormer window can be framed on the roof boards, as shown in Figure 11.62, thus allowing a maximum of inside space. To support the weight of the dormer when built in this manner, the attic rafters on either side of the opening must be doubled. Jack rafters are framed into the opening, and must be carefully flashed before the roofing is replaced. The ceiling can be applied directly to the underside of the dormer's rafters where headroom is at a premium, or may be dropped to make a continuous ceiling with the inside of the room.

Hip roofed dormers often accommodate taller windows than the gable or shed roof type and therefore extend farther back into the house roof, providing extensive

headroom in depth. The collar beams or ceiling joists shown in Figure 11.63 should be located so as to align the dormer's ceiling with that of the room's ceiling. This type of dormer can be framed also on the roof boards.

Wiring. Prior to filling the outside partitions with insulation, or closing up inside partitions with wallboard, all electrical wiring should be completed. In all probability there will be one or more light receptacles already installed in the attic. If such is the case, it will be necessary to trace their circuit in order to determine its present load. Add to this the total wattage of the lamp receptacles

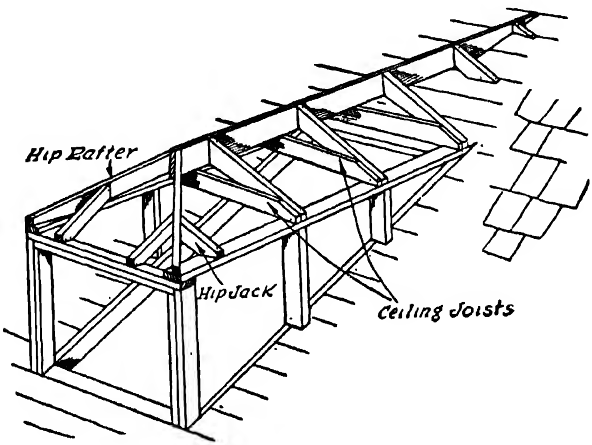


FIG. 11.63 Hip roof dormer framing.

and outlets to be installed, based on the maximum sized bulbs which will be employed (at least 100 watts), in order to determine the over-all load which is to be imposed on the circuit.

CAPACITY OF WIRE BY SIZE

Wire Size	*Maximum Safe Load in Watts per 110 Volts*	*Size of Fuse in Amperes*
14	1,650	15
12	2,200	20
10	2,750	25
8	3,850	35

In the majority of homes branch circuits are wired with No. 14 wire, which is designed to carry a maximum safe load of 1,650 watts; for safety's sake this load is usually estimated at only 1,200 watts or, sometimes, at 12 outlets. Consulting the table above, it will be noted that a No. 14 wire imposes a limitation

of 15 amperes on the load. Using the formula $W = V \times A$, where W represents watts, V, volts, and A, amperes, by substituting the known quantities of 15 amperes and the usual 110 volts for the house voltage, the maximum safe load for this size of wire is 110 times 15, or 1,650 watts, as originally stated.

It is evident, therefore, that if the total wattage to be added to the existing circuit exceeds the safety factor of 1,200 watts, it will be necessary to add as many additional branch circuits, when wired with No. 14 wire, as the total number of watts contains 1,200, or the total number of receptacles or outlets contains 12. If it is intended to include a kitchenette with electrical appliances, the total wattage will jump tremendously. Nearly all appliances are rated in watts, but if the figure is not visible the following table can be used as a guide for estimating purposes only. An electrician should be consulted for exact figures.

Appliance	*Wattage*	*Appliance*	*Wattage*
Electric fan	100	Percolator	400– 600
Radio	100	Toaster	500–1000
Vacuum cleaner	300– 500	Waffle iron	500–1000
Electric iron	500–1000	Heater	600–1000

When an additional branch circuit is required because of the proposed increase in load, it will probably be necessary to run a line from the basement fuse block, unless branch fuse boxes exist in the attic or on other floors. Good wiring prac-

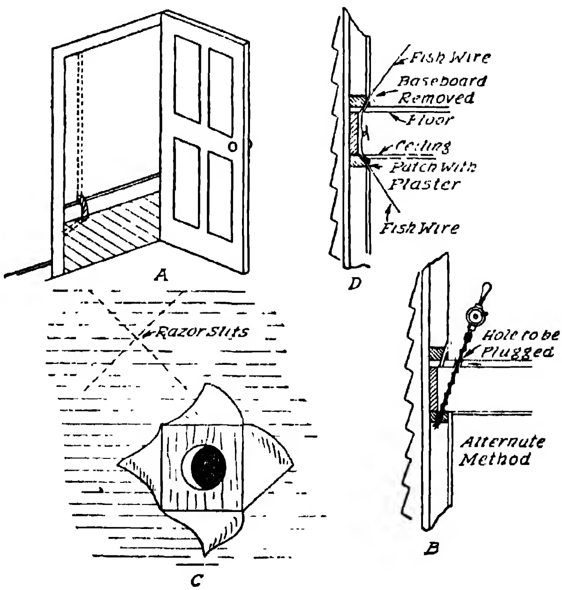


Fig. 11.64. Wiring details.

tice should have provided a fuse block larger than originally required, to take care of future expansion.

If it is possible to select a closet on the floor or floors below, where exposed cable will not be an eyesore, then the floor and ceiling plate obstructions on the lower floor can be by-passed as shown in A of Figure 11.64. If not, assuming that the cable has been dropped through a hole bored in the plate of a partition or side wall from the attic, it will be necessary to remove a portion of the baseboard and bore a diagonal hole through the floor in the case of a side wall, as in B, Figure 11.64. Another diagonal hole bored through the wall near the ceiling will clear the ceiling plate of the room below. The hole can be later plastered up and, when covered with wallpaper, will be indistinguishable if the paper is first slit diagonally with a razor blade and folded back as shown in C.

Long "fish wires" (any fairly stiff wire with a hook at its end) will facilitate the threading of armored cable through the walls. The ends of the "fish wires" are manipulated until they hook and the attached cable can be drawn through the holes around obstructions.

Where the proposed load does not require installation of a branch circuit, it is a simple matter to first open the main switch and then to unscrew the attic light's outlet box cover and force open an additional "knock-out" for the branch line; if the light is attached to the conventional general purpose outlet box, shown in Figure 11.65, unscrew the fixture to gain access to the wires. Black wires are

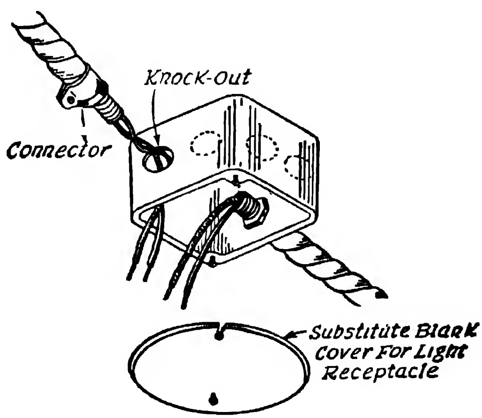


Fig. 11.65. Wiring an outlet box.

attached to black wires and white to white, with soldering and taping in the approved manner, or screw-on, fiber connectors.

For ceiling lights in the new attic rooms, collar beams will have to be paired with an additional beam on the other side of the rafter, to support the bar hanger of the shallow box outlet crosswise. The box itself is countersunk in a hole in

the wallboard or tile ceiling, screwed up until it is flush with the outer surface. The cable can then be clamped through the nearest access hole and the wires connected in the usual manner to the low fixture. Few attics will have sufficient headroom for pendant or hanging ceiling fixtures.

The wiring plan should provide for a liberal number of outlets, on the basis of an average of one per 10 ft. of usable wall space. Additional installations will be much more difficult at some later date, when the insulation and wallboard are in place. Convenient outlets or baseplugs can be installed in pairs, usually above the baseboard. Cable can be drawn through holes bored in the studs or, if necessary, the studs can be notched and the cable supported in the notches firmly. The longer the circuit, that is, the more wire used, the lower will be its final efficiency; therefore a plan is essential before proceeding to the actual wiring.

The stairway is best lighted by the use of 2 three-way switches wired as shown in Figure 11.66. This will permit the lights to be turned off and on at either the head or the foot of the stairs.

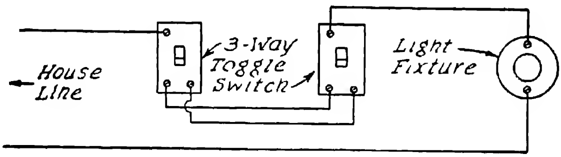


FIG. 11 66 Two-switch lighting circuit

Light switches are customarily located 4 ft. from the floor on the lock side of doors. Bathroom lights should be controlled by wall switches to avoid danger of an electrical shock while standing on a damp floor. No splices are to be made in armored cable. Should such a connection be necessary an outlet box must be used, with all wires securely clamped through "knock-out" holes, and the blank metal cover screwed on as protection against the possibility of sparks from a short circuit.

Insulation. If the attic has not been previously insulated, the proper time to do it can well coincide with the finishing off of any section of it. Proper insulation cuts fuel consumption from 18% to 22% in a frame house, and is a simple matter to install. Four-foot batts or continuous rolls of blanket or quilt insulating material in thicknesses up to 4 in. are manufactured attached to a treated paper coating that acts as a vapor barrier. This waterproof paper extends beyond the 16-in. batts so that it is a simple matter to tack it to the rafters. At many five-and-ten cent stores, small paper stapling machines are available, whose bases can be removed to improvise an efficient stapler for fastening this type of insulation to rafters and studs.

Heating. A good heating engineer installs a boiler in the home heating system which will carry up to 50% additional load. It should therefore be no great problem to extend radiation into the newly finished rooms, except that in the case

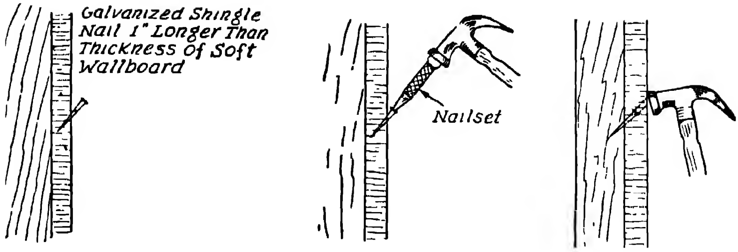
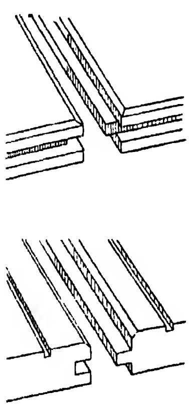


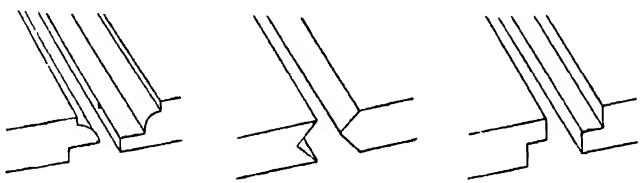
FIG. 11.67. Method of nailing wallboard.

of a hot-water system equipped with a hot-water expansion tank in the attic, the tank will have to be raised above the radiator level. Hot-air ducts and small radiators can be fitted between the studs of the open partitions. Steam and hot-water radiators which are built-in should be backed by a tin and asbestos sheet, concave at the top to throw the heat forward. Attractive grilles can be purchased to cover the opening on the room side. There are also on the market portable steam radiators that can be plugged into the electric circuit.



Attaching the Wallboard. Different methods exist for attaching wallboard to framing, varying all the way from the concealed nailing of softboard, as explained in the section devoted to Installing a New Ceiling over Old One, (p. 506), to the tongue-and-groove or rabbeted edges found in planks. The latter are laid up as described in the section on Knotty Pine Paneling (p. 511).

All types of wallboard can be cut with an ordinary cross-cut handsaw. Plasterboard can be scored with a sharp knife and snapped off along a straight-edge. When sawing long lengths of flexible wallboard laid between saw horses, better results can be obtained by clamping two long pieces of scrap lumber above and below the side being sawed, for rigidity. Soft wallboards should be conditioned for a day or more, by laying them singly around the room where they are to be installed. In very dry weather they should be sprinkled lightly and piled flat for a day or two for conditioning.



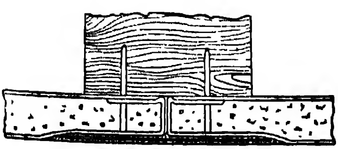


FIG. 11.68a. Various joints, battens or molding and straps used to attached wallboard.

Before nailing, the first board on each wall should be carefully checked to see that it is plumb. It is then nailed along its intermediate stud at 6-in. intervals in the manner shown in Figure 11.67. Afterwards, the edges are nailed at 3-in. intervals, near enough to the edges to catch the stud.

Several types of wallboard are available. One comes in square-edged sheets which are nailed vertically and their cracks covered with battens or plastered and covered with a strip of coarse cloth, glue-sized into place. A thinner type has a recessed edge, which can be plastered up level in a concealed joint suitable for wall-papering. This type of board is habitually applied horizontally, thus providing greater rigidity for new partitions. It is not considered good practice to butt sheets of wall-board tightly against each other. A 1/8-in. space should be left for expansive movements.

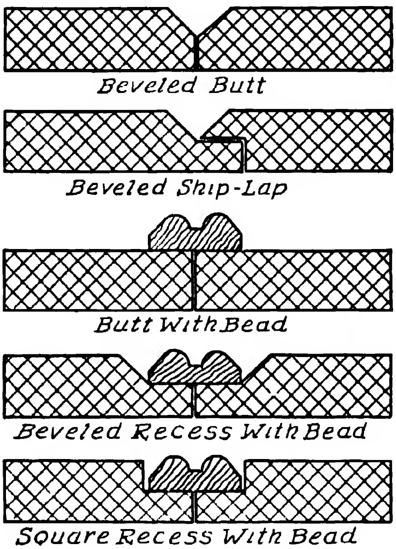


FIG. 11.68*b*.

Soft wallboard can be grooved into various panel effects by means of special planes furnished by the manufacturer. Random planks can usually be attached to their horizontal framing or furring, by concealed nailing through their tongues, like flooring, using the same general procedure explained in the previous section on knotty pine paneling. Various other joints, battens or molding are shown in the diagram of Figure 11.68.

Tileboard in squares or horizontal lengths is a most suitable waterproof covering for the bathroom walls. It can be snapped into position in chrome or plastic moldings which are first nailed in place as explained in the preceding section on Modernizing the Bathroom.

If ceiling tiles are used, furring strips should be installed to support them in the manner described in Installing a New Ceiling over an Old One (supra). Wallboard sheets can be applied directly to the collar beams and their seams plastered for a calcimine, cold-water paint or wallpaper finish. When applying large sheets of wall covering to the ceiling, it will be necessary to construct a T-buck, or helper, as described in the section on ceilings.

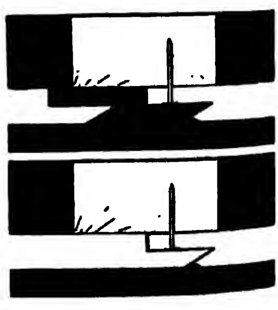
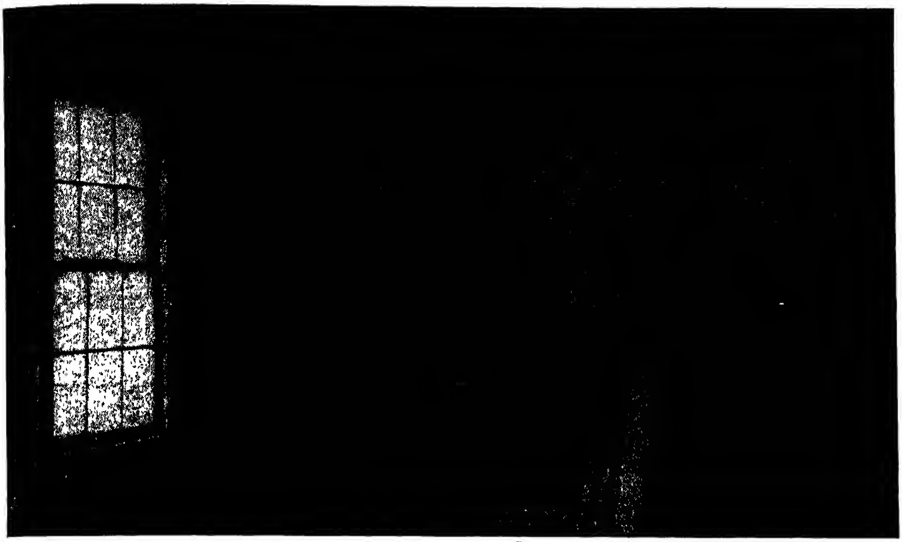


FIG. 11.68*c*.

Since cove moldings, such as those shown in Figure 11.69, cannot be used on the sloping walls, a neat fit will be required where the side walls join the ceiling



Courtesy U.S. Gypsum Remodel Research House

FIG. 11.69. Concealing wall and ceiling joint with cove molding.

Photograph by the Makers of Armstrong's Linoleum

FIG. 11.70. Attic guest room with built-in bunks.

or slanting side walls. This requires careful measurements and, in many cases, an assistant to hold large sloping sheets in place while they are being secured. Wallboard planking, however, is easily applied by one pair of hands.

Flooring. Most attic flooring is unsuitable for a finished room unless laid for expected future expansion. Since nailing a new floor may cause dangerous vibrations to the ceiling below, linoleum is a most satisfactory solution. If the underfloor is rough, then sheets of plywood, well secured will serve as an excellent base for either linoleum or asphalt tiles.

BUILDING A BASEMENT RUMPUS ROOM

When sufficient headroom exists, much of the rubbish-collecting space in a dry cellar can be advantageously used with careful planning. This is particularly true in houses equipped with gas or oil heat, which eliminates not only the soot and ash dust of the coal burners, but also the necessity for fuel bins and the space required for the fireman and his ash cans.

Whatever the type of heating installation, a rough plan should first be drawn to determine how much space can be allotted to recreational purposes, and how the existing stairway will fit into the plan.

Ceilings. No matter how extensive a treatment is contemplated for the walls and floor, the installation of a ceiling in a portion or all of the basement will not only improve the looks and value of this part of the house, but will prevent dust and drafts from infiltrating into the upper floors. In addition, if constructed from gypsum board or metal lath and plaster, such a ceiling will act as an efficient retardant to the disastrous upward spread of any accidental basement fire.

Depending on the type of wall covering chosen, the treatment of the ceiling can be as outlined in the section devoted to Covering an Old Ceiling With a New One (p. 502). When the home mechanic possesses the ability to create or reproduce outdoor mural effects on the walls, or can procure a mural wallpaper, an effective and easily applied ceiling consists of striped canvas tacked directly to the ceiling beams. These widths of canvas need not be stretched tight, for the effect desired is that of an outdoor canopy suspended from an invisible frame.

In the case of overhead pipes with sufficient headroom beneath, it may prove desirable to conceal them completely with a false ceiling. This can be a simple matter in the case of the striped canopy ceiling, or a stronger framing of 2 in. × 2 in. or 2 in. × 4 in. furring "dropped" from the ceiling rafters far enough to clear the overhead piping, as in Figure 11.71. Spaced on 24-in. centers and braced at right angles at whatever intervals are required by the

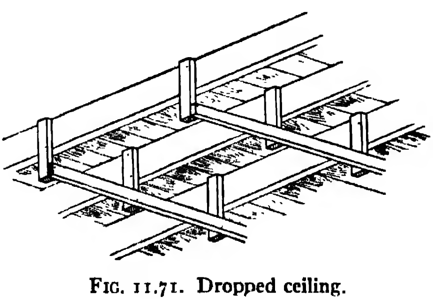


FIG. 11.71. Dropped ceiling.

size of the room, a dropped ceiling will support wallboard sheets 4 ft. wide. Before enclosing the exposed pipes, however, they should be thoroughly checked for any signs of leakage or condensation. Condensation on cold water pipes can be avoided by wrapping them with hair felt or enclosing them in asbestos jackets, or both.

Since few basements possess excess headroom, it may be preferable to box in exposed horizontal or vertical piping with boards, tin, wallboard on frames or lattice work. Such construction when painted to match the ceiling or walls, becomes relatively unobtrusive. If preferred, the exposed pipes can be painted, after undergoing a stiff brushing with a wire brush.

For the nautically minded, a ceiling of hard wallboard can be installed with all joints covered by wide battens into which upholsterers' tacks have been inserted to counterfeit rivets. When thoroughly undercoated and finished in white gloss oil paint, a ceiling so treated will complement similar wall treatment to simulate effectively a ship's steel plates.

Regardless of the type of ceiling chosen, all openings around pipes to the upper floor should be completely closed, preferably with Portland cement, in order to discourage the passage of mice and rats, as well as drafts.

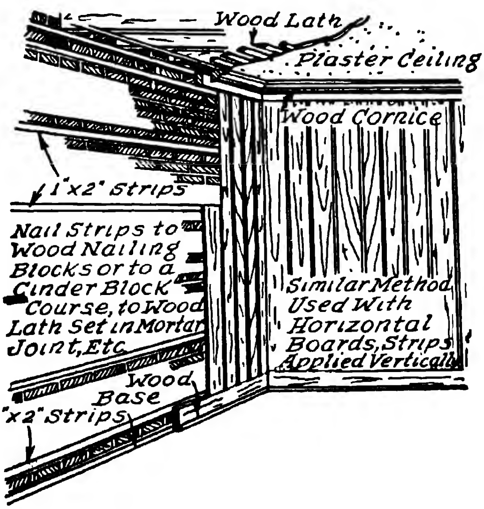


FIG. 11.72 Installing furring to a wall.

Walls. Cement poured walls can sometimes be smoothed down with a carborundum brick and painted. A more satisfactory method is to install furring to the walls, as shown in Figure 11.72; to this any type of wallboard can be attached. Vertical knotty pine boards are very popular for rumpus rooms, and can be applied as described on p. 511. Plywood panels are a more economical wood covering, and there are wallboards with lithographed graining that very closely resembles the

real thing. Other wallboards are described in the section devoted to Finishing the Attic with Wallboard. Regardless of the type of material selected to cover the furring, this method of treatment for basement walls is preferred, not only because it can be used to bring the walls flush with, or beyond the thicker, poured foundation, but because it serves as highly desirable insulation.

When 2 in. × 2 in. or larger furring is used to screen the masonry walls, it can be attached at the ceiling end to the overhead rafters, and at the bottom to a horizontal plate bolted to the floor. In cement-floor cellars it is best to attach such a plate by means of expansion bolts anchored in waterproof lead sleeves, which are inserted in holes drilled at intervals in the floor. If 1 in. × 2 in. side furring strips can be used, their placement must be measured carefully and marked, so that holes can be drilled at suitable intervals in the walls with a star hand drill, and fiber tubes (called "Rawlplugs") inserted for bolts, or whittled wooden plugs driven in flush to receive screws or nails. For 4-ft. widths of wallboard or plywood applied vertically, furring need be only 24 in. on centers, but must be accurately placed where the sheets of wallboard meet. The same care is, of course, necessary if the wallboard is to be applied horizontally, to create an illusion of spaciousness rather than height.

For the shipboard effect previously mentioned, hardboard is applied so that the vertical joints between sheets coincide, where possible, with ceiling joints. Battens of thin wood or wallboard 4 in. wide are nailed over the joints, and can be studded with upholsterers' tacks or other imitation rivet heads. An additional batten should be applied to the top of the wall where it joins the ceiling. Two undercoats of white paint followed by a white gloss oil paint completes the finish. Circular dummy portholes studded with "rivets"; round life preservers, seat "lockers," and iron pipe handrails on the stairway, will help to carry out the shipboard feeling, with a shuffleboard painted on the floor and deck tennis available for the sports program.

Slab siding with the bark on will create a log cabin effect, or milled imitation log siding can be quickly laid up and stained as desired.

No matter what type of siding is decided upon, it is highly recommended that the masonry walls be first coated with tar or asphaltum paint, to insure dryness. Also, before either ceiling or walls are applied, all additional electrical wiring must be completed where required. Suitable overhead fixtures, when headroom exists, are suggested in a later paragraph.

Partitions. There will be at least one point in the basement which will require partitioning. This can be constructed from 2 × 4 studding which is attached, like the furring, either directly to the ceiling beams or to 2 × 4 bridges between adjacent beams. If wallboard is used, these upright studs need not be closer than 24-in. centers with horizontal bridges at suitable heights to insure rigidity. The floor ends of the studs are toe-nailed to a 2 × 4 plate bolted to the floor as already explained. Lead anchored or butterfly bolts are preferable to fiber or wooden plugs because of the ever-present possibility of dampness on the cellar floor. To

insure rigidity, all door framing should be of double thickness and well braced, in order to prevent the possibility of vibration if the door is slammed.

Floors. If the cellar floor is dry, smooth and level, painting is the most economical method of finishing. To carry out an outdoor motif, the floor can be painted to represent flagstones by first applying a light gray waterproof undercoat to represent mortar, then random flagstones are painted in with floor enamel, creating a patio effect. This affords an excellent opportunity for mixing odds and ends of floor enamel, since the more deviations in shading, the more realistic will be the result. Such a treatment, furthermore, will obviate the necessity for repainting the entire floor at some future date, to cover isolated worn spots or tracks.

Asphalt tiles, while more expensive than linoleum, will provide a lasting surface, both colorful and waterproof. Since the tiles are cemented direct to the concrete floor with a special adhesive supplied by the manufacturer, the underfloor must be smooth, as well as dry and free from grease or paint. To test for dampness, lay a left-over piece of linoleum or carpet on the floor for a few days, then remove it and look for a dark patch indicating dampness.

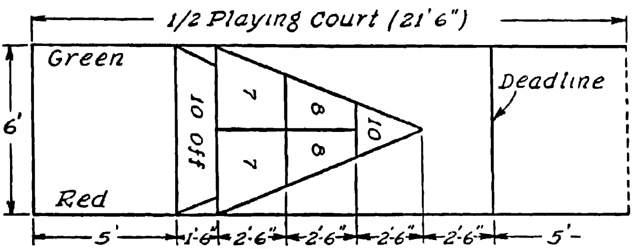


FIG. 11 73. Layout of one-half of shuffleboard court

A permanent shuffleboard can be inlaid in the tiling of the floor. The standard dimensions of an end of the "boards" are shown in Figure 11.73, and although the extreme length of 43 ft., with deadlines 10 ft. apart, is official, it can be varied to suit the available space so long as at least 5 ft. is allowed from the walls at both ends. The cues or pushing sticks should not exceed 6 ft. 3 in. in length and can be constructed from old broom sticks or dowel rods. The eight disks, 4 green and 4 red, are of 1 in. × 6 in. maple, turned on the faceplate of a lathe, then waxed and polished.

A wooden floor is probably the most desirable treatment because it seems to warm up a cellar room by creating an "upstairs" feeling. It is especially desirable where small children may be expected to sit or play on the floor and is the most satisfactory method of leveling up a floor having a pronounced pitch. For a small room the cost need not be excessive, particularly if the underfloor is level and

2 in. × 2 in. stringers can be used. A single thickness of tongue-and-groove pine or fir flooring will be sufficient.

A wooden floor laid over cement will require ventilation underneath. This can be insured by having the ends of the stringers open, with cross ventilation provided for by low blocks toe-nailed at 24-in. intervals under each stringer, as shown in Figure 11.74. Before laying the stringers, it is advisable to coat the cement floor with tar or asphaltum paint, as insurance against dampness and future rotting of the blocking.

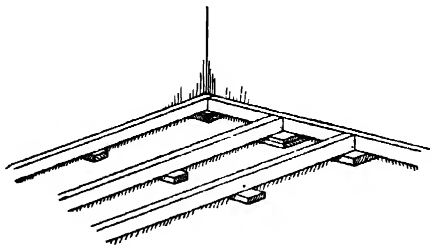


FIG. 11.74. Leveling floor stringers.

Regardless of whether or not a pronounced pitch can be observed in the concrete floor, it is well to proceed on the supposition that the underfloor is not level. The work of laying the stringers is begun in one corner by leveling up a stringer against a side wall on blocks. If there is a noticeable pitch to the concrete floor, 2 × 4 stringers will be required, together with blocks of varying sizes. Next level up a straight edge at right angles to the first stringer to insure that all stringers are level in both directions. The remaining stringers are inserted on 16-in. centers and the flooring applied using finishing nails driven at a 45° angle through the tongues; to prevent hammer marks, use a nail set for the last few strokes on each nail. For tightening keep a scrap of the flooring handy as a block to absorb hammer blows against the edges of each new course of flooring. Painting or coating the underside of the flooring with linseed oil will give added insurance against warping from possible dampness. The flooring can now be stained, painted or covered with linoleum, as desired.

Windows. The average cellar windows are too small and too few in number for adequate ventilation and light during year-round occupancy of the basement room. This calls for enlargement by cutting out the masonry with a cold chisel and substituting larger window frames. If the bottom of the window frame remains above the level of the grade, either casement or pivoted swing-out windows can be installed in the new framing. Windows which are close to, or below the grade, will require a well, as shown in Figure 11.75. Such windows may be swing-in, casement style, or the steeled framed, tilting type, as preferred. To reflect additional light the inside of the well

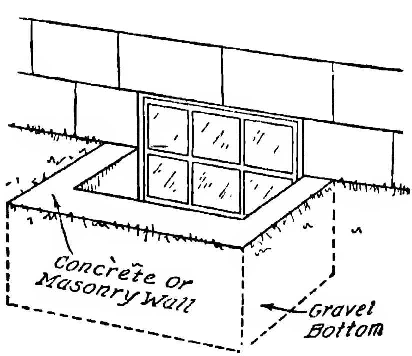


FIG. 11.75. Basement window well, below grade.

should be painted light yellow or cream. When a furred wall has been built around the inside of the window opening, its framing must be extended to cover the additional space. The finished windows can be set off by wood or wallboard valances, bright chintzes or venetian blinds. Half, or "Dutch" shutters on the inside, will give the illusion of length to short cellar windows.

If several windows are available, it may prove advisable to install a ventilating fan in one, similar to the one described in Bringing the Kitchen Up-to-date (page 541). Operated for a few minutes each day this type of fan will remove any

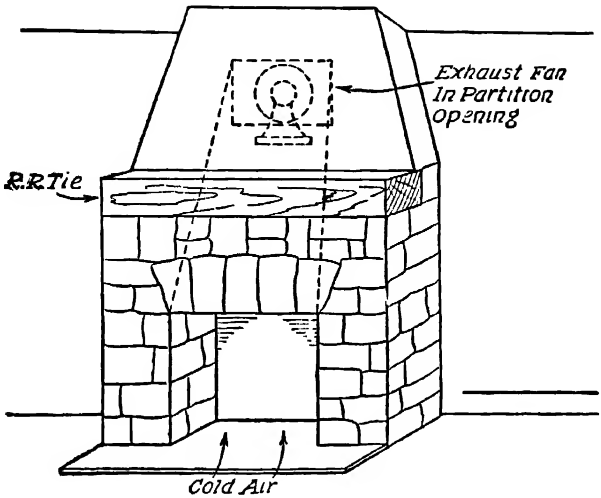


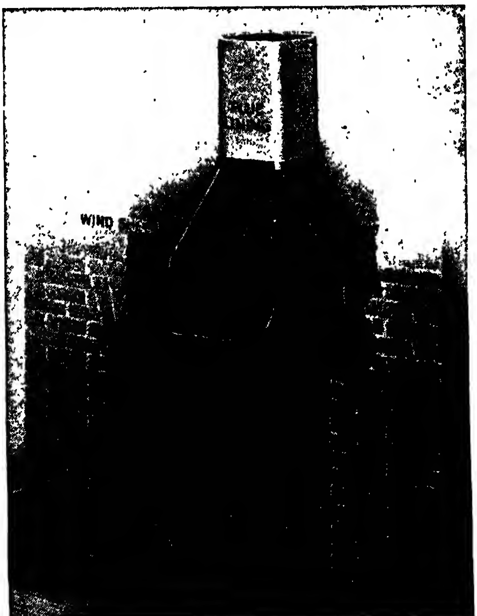
FIG. 11.76. Fireplace ventilator.

existing damp, musty air, replacing it with fresh, outside air. Moist air, however, is heavy and is liable to remain close to the floor, making it difficult of removal from a higher level. One satisfactory solution is to mask the blower and air duct with an artificial fireplace, which will draw the damp air from floor level up to the fan, as illustrated in Figure 11.76. When a wooden floor has been laid, with stringers open, as previously described, the exhaust fan can be hooded and grills placed a few inches from the floor on several sides of the room, so that a circulation of air can be created under the floor and behind the walls.

Heating. The older type of heating plants are so constructed that they keep the cellar warm while in operation. With such a plant, a latticed grille in the nearest partition, as described in Chapter 4, may warm the newly constructed room sufficiently. Modern heating plants, however, are designed to give off little or no heat in the basement or room in which they are installed, unless their piping or ducts have not been insulated. In the case of a hot-air plant, another duct can

be connected up to the room with little additional strain on the furnace. With steam or hot-water plants, a floor radiator, being below the water level in the boiler, would impede the circulation. Therefore an overhead radiator must be resorted to, with attendant loss of headroom, unless a special size can be procured to fit within the space between ceiling beams. In this case, the recess should be well insulated with asbestos, topped with a bright tin reflecting surface. Electrical and gas steam radiators are on the market, which can be placed at floor level, or recessed in a partition wall behind a suitable grille. The recess should have a concave curve at the top and be lined with metal to throw heat outward into the room. The grille should provide an opening for cold air at the bottom as well as for the exit of the light warm air at the top.

Fireplaces. A practical fireplace is a most desirable means of heating a basement room, particularly if a rustic or log cabin effect is the goal. However, one flue cannot efficiently service more than one heating unit, including a fireplace; therefore, even if the home heating plant is oil- or gas-operated, no attempt should



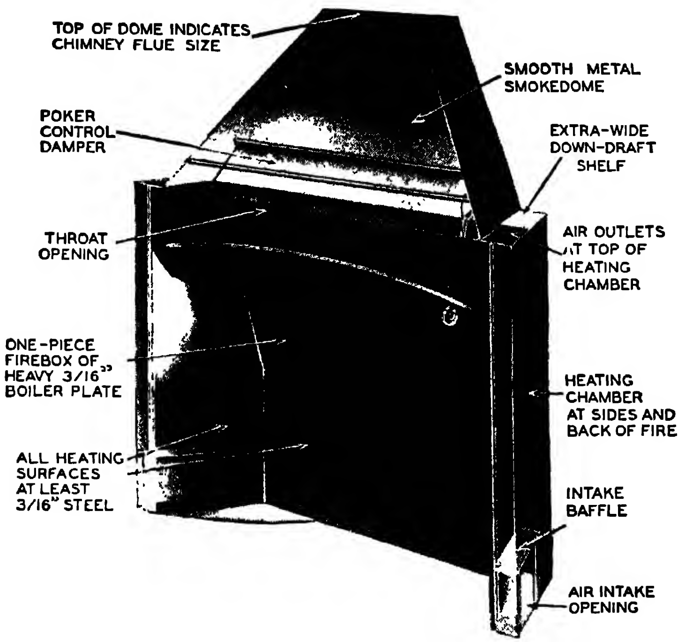
Courtesy H. W. Covert Company

FIG. 11.77.

be made to utilize its vent or flue without competent technical advice. Should there be an available flue, it is not difficult to lay up a brick or stone fireplace if a cast-iron throat damper (Figure 11.77) is used as a form around which the

bricks or stone can be cemented. This will insure accurate dimensions at a critical point plus a properly placed wind shelf. The fireplace opening should be at least 10 times the area of the flue, with the width greater than the height. The depth should be not less than 20 in., lined with firebrick, which provides for circulation of the heated air, as indicated.

It a practical fireplace cannot be constructed, the next best substitute is an imitation fireplace using a gas-heated element. Construction of this type of fire-



Courtesy Heatilator, Inc.

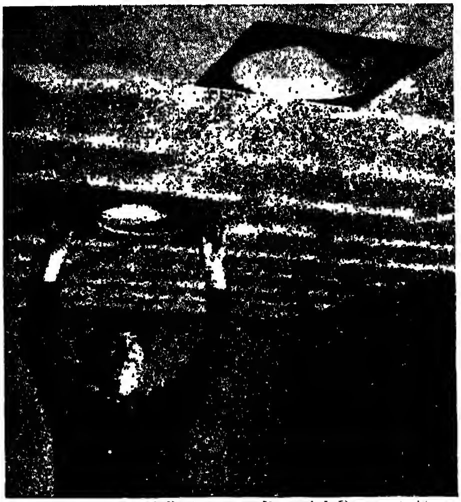
FIG. 11.78.

place is explained in Chapter 4. The only addition necessary is a sheet metal concave reflecting and protecting shield at the back of the fireplace, backed by asbestos.

A partition offers an excellent location for an imitation fireplace which depends on electrically lighted logs for its effect, because the fireplace can be built into the partition, flush with the front wall, thus conserving floor space. As already mentioned under heating, an imitation fireplace can be built over a window in which a ventilating fan has been installed, with a duct from the fireplace opening to the window for the direct suction of the low-lying moist air. This type of

imitation fireplace lends itself very well to a log cabin interior because of the necessity of concealing the duct with a chimney effect.

The easiest method is to cover a suitable 2 × 2 framework with wallboard over which imitation brick asphalt siding is cemented. For the home craftsman who prefers a fieldstone effect, however, the wallboard covered frame fireplace must next be covered with ¼-in. wire mesh tacked to the framing in the areas which are to represent stone work. An asbestos plastic, applied with a trowel to the wire mesh in varying thicknesses, can be raked or grooved with a modeling tool to represent mortar joints between random pieces of dressed fieldstone.



Courtesy U.S. Gypsum Remodel Research Home

FIG. 11.79. Installing flush ceiling lights.

The plastic is made by first thoroughly mixing the proportion of 4 lbs. of whiting with 12 lbs. of ground asbestos fiber. To this mixture is added 1 gallon of hot water to which 4 lbs. of dextrin and 5⅝ pts. of sulphonated castor oil has been added. The exact amounts should be used, particularly in the matter of the water, and while the asbestos-whiting mixture is being added, the ingredients should be stirred constantly, finally kneading the mass with the hands. This mixture can be kept for a month if covered with damp cloths.

The plastic should be pressed well into the wire mesh to a thickness of at least ¼ in., thicker at random spots to the inequalities of individual simulated stones. What little troweling is required should be accomplished with a trowel dipped frequently in water; the plastic will dry within 48 hrs. to the color of cement. A wash coat of artists' oil colors, thinned in pure turpentine, can be used to tint all but the counterfeit mortared joints. Various mixtures of yellow, orange, blue and green, tinged with raw umber, should be tried out in the fireplace opening

to produce various tones of fieldstone. The fire pit itself is finally coated with lampblack, to produce a scorched effect.

Lighting. The methods employed to light a basement recreation room will depend not only upon the area involved, but upon available headroom. In addition, the lighting fixtures must carry out or blend with the general effect of the room. Lack of headroom will frequently be a deciding factor, which can be easily counteracted by the installation of a liberal number of double convenience outlets or base plugs, for standing and table lamps. These outlets are usually placed just above the baseboard, and in the case of a dark cellar room, can be spaced so that

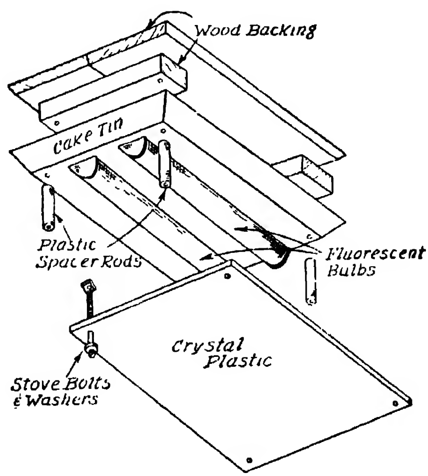


FIG. 11.80 Cake tin ceiling fixture.

there is one for every 6 ft. of wall space, including doors and windows. At least one of these outlets should be controlled by a switch, located 4 ft. from the floor line on the lock side of the entrance door, thus obviating the necessity of groping for a lamp cord or key socket in the dark.

As explained in the section on Finishing the Attic with Wallboard (p. 555), the estimated load must be calculated in order to determine the size of wire to be used. The wattage of appliances, such as heaters, toasters, percolators, waffle irons, etc., must be carefully computed to insure that no overload is imposed on the circuit. If the rating of the appliance is unknown, the table on p. 556 can be used as a guide only.

Under the rule that the maximum safe load for a 15-ampere branch circuit wired with No. 14 wire is equal, in watts, to the product of the volts times the amperes, it must be remembered that 1,650 watts is the *maximum* safe load. Subtract from this the total wattage of the lights in use, to determine what appliances can be added without the installation of a separate branch circuit to service them.

Courtesy U.S. Gypsum Remodel Research Home

FIG. 11.81*a*. Before: Grimy cellar.

Courtesy U.S. Gypsum Remodel Research Home

FIG. 11.81*b*. After: Comfortable extra lounging room.

Courtesy the Makers of Armstrong's Asphalt Tile

FIG. 11.82*a*. Before: Wasted space.

Courtesy the Makers of Armstrong's Asphalt Tile

FIG. 11.82*b*. After: English taproom.

A method of circumventing the limitation imposed by insufficient headroom is the installation of flush lighting between the ceiling beams or between the studs of a partition, as shown in Figure 11.79. The interor of the recess should be lined with sheet metal or asbestos, and the molding that holds the opal glass or sheet of translucent plastic should be either hinged or have one removable piece to permit access to the bulb when necessary.

Another popular lighting device is to conceal the bulbs or lighting tubes in a window cornice, for indirect lighting. The cornice consists of curved pieces of plywood secured to a flat back board, forming a shallow trough in which suitable lamp receptacles are installed in parallel. The interior should be painted white or lined with bright tin to afford maximum reflection.

Fluorescent lights are great space savers for overhead lighting and provide excellent light for table tennis, deck tennis, and other indoor sports. They can be installed flush with their own sockets or screwed into existing sockets, if desired. An interesting ceiling light can be built from an inverted cake tin, suitably enameled or lacquered, upon which two or more fluorescent bulbs are mounted in parallel, to a wooden backing. Four hollow ⅜-in. plastic spacer rods hold a sheet of crystal plastic in place below the bulbs by means of ⅛-in. stove bolts, as shown in Figure 11.80. Other interesting styles can be assembled from plastic tubes and ordinary electric bulbs and sockets, using alternating squares or disks of transparent and translucent plastic in varying rich colors, spaced by plastic rods.

For the rustic interior with adequate headroom, an old carriage wheel scraped and varnished, can be hung horizontally by three chains and wired with candle-type sockets to create a most effective chandelier. Simple white fixtures should be used in the nautical setting, and for an outdoor effect, a cove similar to the window cornice can be attached on all four walls of the room, and lined with clear Christmas tree bulbs for indirect cove lighting. A second set of blue bulbs controlled by a second switch will give a twilight effect when the games are put away

Miscellaneous. It may not be possible to lay out a basement room without including one or more pillars in some central location. A simple treatment is to box them in with narrow boards, mitered at the corners, then trimmed with whatever molding is available or desired. In the nautical room no camouflage is possible, round pillars being painted a glossy white, with a "rivet" studded collar cut out of softwood or linoleum, where the column enters the ceiling. The outdoor room calls for the concealment of the column with real or imitation bark, if obtainable, or with wire mesh covered with plaster of Paris painted to resemble a tree trunk. An artificial vine twined around the "tree" will add to the illusion. Depending on the placement of the pillar, it may be preferable to accept it as the central support for a round table, cut from two semi-circles of plywood which are cleated together to rest on heavy angle irons, bolted to the pillar, or supported lower down, as a seat, similar to the one pictured in Figure 11.82*b*.

The door, or doors, should also conform to the treatment of the room. The rustic interior or log cabin door can be assembled from rough boards or slabs,

visibly cleated at top and bottom, with a diagonal cleat running crosswise, and a metal or wooden latch substituted for the conventional doorknobs. To effect a surprising contrast, thin boards can be nailed and cleated as above to the interior of an ordinary panelled door. The outer surface of the door is painted and equipped with a glass doorknob whose spindle can be adjusted to operate the latch on the inside. In the same manner doors opening into knotty pine paneled interiors can be covered by pine boards in continuation of the panelling; an extra hinge will probably be required to support the added weight. Doors to a nautical room can be made from scrap lumber, covered with imitation leather. They can be mounted in pairs, with circular windows in the upper section to carry out the shipboard effect.

As already mentioned, the maritime stairway features iron pipe handrailings and no risers. This is also true of a stairway to a modernistically furnished room. Small log handrails, with or without bark, are the natural guides to an outdoor or log cabin room, while a stairway leading to the knotty pine interior can be enclosed in identical pine panelling. Whatever the treatment chosen, however, stairways should be adequately lighted, or the evening's anticipated pleasure may be clouded by a near accident.

INDEX

INTERNATIONAL SERIES IN PURE AND APPLIED PHYSICS

LEONARD I. SCHIFF, *Consulting Editor*

Allis and Herlin Thermodynamics and Statistical Mechanics
Becker Introduction to Theoretical Mechanics
Clark Applied X-rays
Evans The Atomic Nucleus
Finkelnburg Atomic Physics
Ginzton Microwave Measurements
Green Nuclear Physics
Gurney Introduction to Statistical Mechanics
Hall Introduction to Electron Microscopy
Hardy and Perrin The Principles of Optics
Harnwell Electricity and Electromagnetism
Harnwell and Livingood Experimental Atomic Physics
Harnwell and Stephens Atomic Physics
Houston Principles of Mathematical Physics
Hund High-frequency Measurements
Kennard Kinetic Theory of Gases
Leighton Principles of Modern Physics
Middleton An Introduction to Statistical Communication Theory
Morse Vibration and Sound
Morse and Feshbach Methods of Theoretical Physics
Muskat Physical Principles of Oil Production
Present Kinetic Theory of Gases
Read Dislocations in Crystals
Richtmyer, Kennard, and Lauritsen Introduction to Modern Physics
Schiff Quantum Mechanics
Seitz The Modern Theory of Solids
Slater Introduction to Chemical Physics
Slater Quantum Theory of Atomic Structure, Volume I
Slater Quantum Theory of Atomic Structure, Volume II
Slater Quantum Theory of Matter
Slater and Frank Electromagnetism
Slater and Frank Introduction to Theoretical Physics
Slater and Frank Mechanics
Smythe Static and Dynamic Electricity
Stratton Electromagnetic Theory
Thorndike Mesons: A Summary of Experimental Facts
Townes and Schawlow Microwave Spectroscopy
White Introduction to Atomic Spectra

The late F. K. Richtmyer was Consulting Editor of the series from its inception in 1929 to his death in 1939. Lee A. DuBridge was Consulting Editor from 1939 to 1946, and G. P. Harnwell from 1947 to 1954.

PRINCIPLES OF ELECTRICITY

AND

ELECTROMAGNETISM

BY

GAYLORD P. HARNWELL
Mary Amanda Wood Professor of Physics, University of Pennsylvania

SECOND EDITION

NEW YORK TORONTO LONDON
McGRAW-HILL BOOK COMPANY, INC.
1949